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A CLINICO-PATHOLOGICAL STUDY OF EIGHT CASES OF MEDULLOBLASTOMA AND OF ONE OF SPONGIOBLASTOMA EPENDYMALE SIMULATING MEDULLOBLASTOMA.

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THE type of neoplasm known as "medulloblastoma" was first separated from the rest of the gliomata as a specific morbid entity by Bailey and Cushing.[(1)] It may be defined as a highly malignant but X-ray sensitive tumour of children (occasionally adults), which takes its origin from the roof of the fourth ventricle. The tumour has a pronounced tendency to metastasize by means of the cerebrospinal fluid.

The present paper deals with the clinico-pathological findings and the results of treatment in eight cases of medulloblastoma which have occurred in South Australia. In addition a case is described in which the anatomical localization of the tumour and the clinical picture were compatible with a diagnosis of medulloblastoma. Histopathological examination, however, led to reclassification of the case as one of *spongioblastoma ependymale*.

Summary of Case Records.

CASE I.—L.O., aged forty-seven years, a married woman, was admitted to the Royal Adelaide Hospital on July 3, 1928. For about two months she had suffered from almost constant headache, giddiness, vomiting, insomnia and inability to walk unaided. Vision had been failing rapidly for a month. For a fortnight she had suffered from "shivering" attacks, which began in her legs and became generalized; they were so severe that they almost shook her out of bed. During the same period she had had intermittent loss of control of her fingers. Sometimes she noticed "rushing" noises in her right ear.

The patient had a drawling voice, expressionless face and difficulty in keeping her eyes open for any length of time. Nystagmus was present, especially when she looked towards the left. The optic disks were slightly blurred. Hearing was impaired, more so in the left ear. There was a firm mass on the right side of her neck at about the level of the fourth and fifth cervical vertebræ; it was not painful and it moved with the spine. Muscular incoordination was present in both arms and legs, but was most evident in the right arm. X-ray examination revealed chronic sclerotic thickening of the bones of the cranial vault. The cervical portion of the spine was normal.

There was no remission of the patient's symptoms. On July 20, 1928, she collapsed suddenly and died within a few minutes.

Autopsy was performed on July 21 by Dr. H. G. Anderson. It was confined to the cranial cavity. The cerebral convolutions were flattened. A soft, whitish, œdematous, slightly vascular tumour occupied the outer part of the left cerebellar hemisphere. Moderate dilatation of the third and lateral ventricles and slight dilatation of the aqueduct of Sylvius were found.

CASE II.—T.O'B., aged thirty-nine years, a labourer, was admitted to the Royal Adelaide Hospital on September 11, 1929. Fifteen months before he had become weak and "out of sorts". For six months he had suffered increasingly from headache and vomiting associated with failure of vision, loss of weight and lack of appetite.

The patient was miserable and very thin; except for vertical nystagmus, no abnormal physical signs were elicited. In the course of three or four weeks increase of the pressure of the cerebro-spinal fluid developed (revealed by lumbar puncture); it was accompanied by bilateral papilloedema, more apparent on the right side. There was concurrent intensification of symptoms.

On October 6 the man's temperature was 103° F. and his pulse rate 140 per minute. Examination revealed incoordination of the hands and inability to sit up owing to weakness and vertigo; both plantar reflexes were extensor in type, and the knee jerks were absent. On October 13 the patient's condition suddenly became worse, his temperature rose to 102·4° F. and death occurred.

Autopsy was performed on October 14 by Professor J. B. Cleland. The lateral ventricles were moderately dilated and the third ventricle much dilated. When the fourth ventricle was opened, a smooth, lobulated tumour, divided into two

[1] Working with a grant from the National Health and Medical Research Council, Australia.

nearly separate parts, presented itself. The smaller part was about three-quarters of an inch in diameter and lay in the upper and anterior portion of the right cerebellar hemisphere. The larger part lay nearer the mid-line and distended the fourth ventricle. It was fairly firm, and had an antero-posterior diameter of one and a quarter inches and a lateral diameter of three-quarters of an inch. The tumour grew from the superior medullary velum, expanded and pushed aside the anterior portion of the vermis, pressed on the mid-brain, and closed the aqueduct of Sylvius.

CASE III.—D.E., a school-girl, aged eight years and eight months, was admitted to the Adelaide Children's Hospital on July 6, 1934. Three weeks before she had had difficulty in using her right hand and had begun to sway sideways on walking. Soon afterwards severe, continuous headache accompanied by vomiting developed. At times she had been drowsy. For some time she had had an evening pyrexia of 99·6° F. to 100·4° F. Four days before her admission to hospital her headache had been relieved temporarily by ventricular puncture. The pressure of the cerebro-spinal fluid in the ventricles had not been found to be increased.

There was a mild degree of bilateral papilœdema. Atonia and asthenia of the right arm and leg were present. X-ray examination of the skull gave negative results. Lumbar puncture revealed that the cerebro-spinal fluid was not under increased pressure.

On July 10 there was an increase in the degree of papilœdema, which was treated by ventricular puncture. Blood examination disclosed a leucocytosis of 20,000 cells per cubic millimetre. On the following day Dr. L. C. E. Lindon performed suboccipital decompression. A further operation on July 19 revealed a mid-line tumour, which was traced upwards into the right cerebellar hemisphere and into the fourth ventricle. Partial removal was effected.

After the operation the child showed little improvement. From August 8 to August 24 she was given deep X-ray therapy at the Royal Adelaide Hospital. On her return she was lethargic, the wound in the cerebellar region still bulged, and fluctuant swellings were present over the sites of ventricular puncture. Bilateral secondary optic atrophy was present. The patient's condition gradually became worse. At times her pulse was very weak and she had difficulty in swallowing. She died on October 6, 1934.

CASE IV.—M.L., a school-boy, aged ten and a half years, was admitted to the Adelaide Children's Hospital on January 14, 1935. For three weeks he had suffered from double vision, morning vomiting and intermittent headache. He had lost his appetite and had felt weak in the legs on standing. Three months before he had fallen onto the back of his head.

Examination revealed pronounced bilateral papilœdema with retinal hæmorrhages. Diplopia was present; but the muscle or group of muscles involved could not be determined. Walking was clumsy, and turning required undue concentration; but balance was maintained fairly well. X-ray examination revealed separation of the cranial sutures and increase of the convolutional markings.

On February 1 suboccipital craniotomy was carried out by Dr. L. C. E. Lindon. A large, brown, soft, vascular and cystic tumour was found in the vermis and left cerebellar hemisphere. Most of the tumour was removed. From March 13 to April 24 and from May 17 to May 28 the child was given deep X-ray therapy at the Royal Adelaide Hospital.

By November, 1935, the patient was able to indulge in athletics and swimming, and in February, 1936, he returned to school. He remained quite well until April. He then complained that his sight was troubling him. Ophthalmological examination, however, revealed no significant pathological change.

On May 13 the patient was readmitted to the Adelaide Children's Hospital with a recurrence of signs and symptoms, which had developed after a hit on the back of the head a fortnight before. In addition, bilateral secondary optic atrophy was present.

On June 6 the child was transferred to the Royal Adelaide Hospital for further deep X-ray therapy. This treatment was deferred, and on June 22 Dr. L. C. E. Lindon increased the size of the decompression opening. On July 2 ulceration of the operation wound occurred. Subsequently meningitis developed, and the patient died on July 29, 1936.

Autopsy was performed by Professor J. B. Cleland; it was confined to the cranial cavity. Purulent meningitis was present. On the under aspect of the right frontal lobe there was a little plaque, apparently neoplastic, paler than the grey matter; it measured 1·5 centimetres by 0·5 centimetre. No obvious tumour was recognizable in the cerebellum, but a soft, friable, spongy tumour, half an inch in diameter, and in close relationship to the optic chiasma, was found growing from the floor of the third ventricle. The lateral ventricles were much dilated.

CASE V.—F.K., aged nine years, a school-boy, was admitted to the Adelaide Children's Hospital on November 1, 1935. For fourteen months he had suffered from attacks of vomiting. They occurred at intervals of a week and lasted two or three days. After a bout of vomiting a headache usually developed; subsequently the patient would go to sleep. Vision remained unimpaired. The child had been in bed for about three months prior to his admission to hospital.

Examination revealed impairment of the response to the right heel-to-knee test, nystagmus when the patient looked to either side, and bilateral papilœdema (two diopters on the right, three diopters on the left). X-ray examination revealed separation of the cranial sutures. On examination a few days later ataxia was present, with a tendency to lurch to the left and general impairment of muscular coordination. The child held his head slightly to the left and approximated the left side of his occiput to his shoulder. On one occasion bradycardia and pupillary inequality developed.

On December 4 Dr. L. C. E. Lindon performed suboccipital craniotomy. A tumour was located, but owing to a pronounced fall of blood pressure it had to be left *in situ*. Further exploration six days later disclosed a soft tumour the size of a cherry plum. Its base was in the mid-line and it was growing into the right cerebellar hemisphere. The tumour was removed piecemeal.

From January 23 to February 7, 1936, the child was at the Royal Adelaide Hospital, where he was given deep X-ray therapy. He was discharged from the Adelaide Children's Hospital on March 4.

The patient was readmitted to hospital on July 18, 1936, with a recurrence of signs and symptoms. On August 18 an operation was undertaken with the object of promoting a freer flow of cerebro-spinal fluid between the dilated ventricles and the subarachnoid space. Adhesions were divided, an incision was made through the vermis into the fourth ventricle, and the right cerebellar tonsil was removed. There were no signs of recurrence of the tumour in the right cerebellar hemisphere. In the angle between the vermis and *medulla oblongata*, however, a small, grey, translucent mass the size of a pea was found.

After operation the patient became comatose and pyrexial. Incontinence of urine and Cheyne-Stokes respiration developed, the wound began to slough and cerebro-spinal fluid leaked freely from it. Death occurred on August 31, 1936.

CASE VI.—R.G., a school-boy, aged eleven years and seven months, was admitted to the Adelaide Children's Hospital on August 28, 1939. Five weeks before he had been sent home from school on account of vomiting. On the way home he fell from his bicycle. He was unable to remember anything about the accident. From then on he had suffered from vomiting, drowsiness and constant headache. These symptoms had been accentuated for a fortnight prior to his admission to hospital.

The patient was thin. His pulse rate was 50 per minute. Bilateral papilœdema was present. X-ray examination of the skull and chest revealed no abnormality. Lumbar puncture showed the pressure of the cerebro-spinal fluid to be 180 millimetres of water.

On September 7 a ventriculographic examination was performed. The cerebro-spinal fluid was under increased pressure. Uniform dilatation of both lateral ventricles and some dilatation of the third ventricle were found, with no mid-line shift or apparent filling defect.

On the following day Dr. L. C. E. Lindon carried out suboccipital craniotomy. He located a tumour about a quarter of an inch below the surface of the left cerebellar hemisphere. It was greyish-pink, very friable, partly demarcated from and partly adherent to the cerebellar substance. It appeared to fill about half of the hemisphere. Partial removal was effected.

After operation the symptoms disappeared. On October 2, however, the scalp at the site of operation began to bulge outwards; the swelling gradually increased in size and became more tense. Vomiting recurred. Death occurred suddenly on October 26, 1939.

CASE VII.—J.D., a farm hand, aged fourteen and a half years, was admitted to the Royal Adelaide Hospital on April 24, 1941. For four months he had suffered intermittently from headache, giddiness, nausea, vomiting and anorexia. The symptoms were most apparent when he awoke in the morning. Vision had remained unimpaired.

Five weeks before his admission to hospital his appendix had been removed. For a time after operation his symptoms had become intensified.

Examination revealed dilatation of the pupils and deviation of the uvula to the right. When the patient's head was bent on his chest, he complained of severe pain in the region of the upper four thoracic vertebræ. No tendon reflexes could be elicited.

After his admission to hospital, the patient's symptoms gradually increased in severity. In addition photophobia, drowsiness, irritability and stiffness of the back manifested themselves. Lumbar puncture showed the pressure of the cerebro-spinal fluid to be increased. Later, bilateral papillœdema, neck rigidity and bradycardia developed. Kernig's sign was elicited. A ventriculographic examination on May 16 revealed dilatation of the third and lateral ventricles. No air entered the aqueduct of Sylvius or the fourth ventricle.

On May 19 examination disclosed weakness of the right hand grip and impairment of response to the "finger to nose" test on the right side. The right plantar reflex was extensor in type. Paresis of the upper movements of the patient's eyes was present. On the following day Dr. L. C. E. Lindon performed suboccipital craniotomy. A large, circumscribed tumour, about two inches in diameter, occupied most of the right cerebellar hemisphere. Partial removal was effected.

After operation deep X-ray therapy was administered. Apart from one minor relapse, the patient made a gradual recovery. On his discharge from hospital on September 11 he felt extremely well. A slight degree of swelling was still present over the operation site. He remained free from symptoms and was able to do odd jobs at home until late in March, 1942.

On April 7, 1942, the youth was readmitted to the Royal Adelaide Hospital. For a fortnight he had suffered from a recurrence of signs and symptoms, together with pain low down in his spine. On April 15, 100 cubic centimetres of clear cerebro-spinal fluid were withdrawn from the occipital swelling; afterwards a hard mass, presumably tumour, could be felt. Further deep X-ray therapy was recommended, but owing to the patient's condition it was not given. On April 23, 1942, the youth suddenly collapsed and died. Death was attributed to hæmorrhage into the tumour.

CASE VIII.—B.B., aged fifteen years, a messenger boy, was admitted to the Royal Adelaide Hospital on January 12, 1942. For six weeks he had suffered increasingly from headache and vomiting. His vision had become impaired and he complained of diplopia. He had suffered also from giddiness and from ringing noises in his left ear. Examination of his optic disks revealed moderate papillœdema. X-ray examination revealed prominence of the impressions of the cerebral gyri.

Suboccipital craniotomy was performed by Dr. L. C. E. Lindon on January 28. A soft, grey, gelatinous tumour the size of a hen's egg was found growing from the roof of the fourth ventricle. Partial removal was effected. After operation the wound became infected. Subsequently signs and symptoms of meningitis manifested themselves. Death occurred on March 10, 1942.

Autopsy was performed on March 11 by Professor J. B. Cleland. It was confined to the cranial cavity. A moderate degree of meningitis was present, especially basally. I made an examination, after fixation of the brain in formol-saline solution, and found that the lateral and third ventricles were slightly dilated and filled with greenish pus. Occupying the roof of the fourth ventricle, especially to the right of the mid-line, was a soft, hæmorrhagic tumour about half an inch in diameter.

CASE IX.—V.S., aged thirteen years, a school-girl, was admitted to the Royal Adelaide Hospital on August 9, 1942. For three weeks she had suffered from vomiting, giddiness and headache. At first the symptoms had been intermittent, but they had gradually increased in intensity.

Slow, coarse nystagmus was present when she looked to the left, and atonia of the right arm and asthenia of the right upper and lower limbs were found. Lumbar puncture showed the pressure of the cerebro-spinal fluid to be normal. No swelling of the optic disks was detected. The slight diplopia present was due to old squint. X-ray examination of the skull on August 17 disclosed very prominent impressions of the cerebral gyri, indicative of increased intracranial pressure.

While in hospital the child continued to suffer from headache and vomiting. On one occasion she had an attack of hiccup. However, despite the positive X-ray findings and the lack of improvement in her condition, she was discharged from hospital on September 30, 1942.

The patient was readmitted to hospital on October 13, 1942. She complained of severe aching in her forehead and in the back of her neck. On the day of admission she had vomited three times. While at home she often used to go "funny" and numb, become giddy and vomit. The child was drowsy. Neck rigidity was present and Brudzinski's sign was present. Muscular incoordination, more pronounced on the right side, was detected. Lumbar puncture showed the pressure of the cerebro-spinal fluid to be 340 millimetres of water. On October 18 examination revealed gross bilateral papillœdema and a hæmorrhage of the left fundus. Suboccipital craniotomy, performed by Dr. L. C. E. Lindon three days later, revealed a soft, hæmorrhagic, plum-coloured tumour, which grew out between the lobes of the cerebellum just above the *medulla oblongata*. It appeared to be coming from the left lobe. Except for a small piece removed for biopsy, the tumour was left *in situ*. Death occurred on the following morning (October 22, 1942).

Autopsy was performed by Dr. J. B. Thiersch, four hours after the patient's death; it was confined to the cranial cavity. The cerebro-spinal fluid was blood-stained and present in excess. There was a thin film of dark blood ventral to the brain stem and cerebellum.

I made an examination of the brain, after fixing it in formol-saline solution, and found mild dilatation of the third and lateral ventricles, which contained a small amount of blood clot. Blood clot was also present in the aqueduct of Sylvius. The fourth ventricle was occupied by a soft, red, friable, vascular, hæmorrhagic tumour, which grew from its roof. The tumour was separated from the floor and to a certain extent from the lateral walls of the ventricle by a thin film of blood clot. The tumour was approximately five centimetres long by four centimetres broad, and three centimetres in depth.

Histopathological Examination.

In Cases I, II and IX the material was obtained at autopsy, while in Cases III, V, VI and VII frozen sections of specimens acquired at operation were utilized. In the remainder both operation and post-mortem material was available. The usual fixative was 10% formol-saline solution; in a few instances formalin-ammonium bromide and Zenker-acetic solutions were employed also. Most of the autopsy specimens were embedded in paraffin. The stains used as a routine measure comprised hæmatoxylin and eosin, hæmatoxylin and van Gieson's, and Mallory's phosphotungstic acid hæmatoxylin. Material suitable for the application of metallic impregnation methods (Cajal's gold sublimate, Bielschowsky and Penfield's modification of Hortega's silver carbonate method for oligodendroglia and microglia) was available only in Cases VIII and IX.

Cases I to VIII.

The tumours were composed principally of small cells, with scanty, poorly staining, indeterminate cytoplasm, packed closely together (Figure I). Their nuclei were comparatively large. They were round, oval or irregularly oval, less often elongated, with a moderate amount of chromatin in the form of a network, and one or more small nucleoli (Figure II). In addition, there was a small proportion of other cells. Some of these had round, occasionally oval, darkly staining, almost pyknotic nuclei, and were about half the size of the principal cells; their nuclei resembled those of lymphocytes. In rare instances dense, round nuclei surrounded by a halo were present; their appearances were suggestive of oligodendroglia. Connective tissue cells with elongated, often fusiform, densely staining nuclei were present also. In Case VIII, Cajal's gold sublimate method disclosed considerable numbers of fibrillary astrocytes scattered throughout the tumour (Figure III).

In six of the cases the degree of vascularity was slight, and in two it was moderate. The majority of the vessels were of small size; their walls consisted of a single layer of endothelial cells supported by a thin stratum of connective tissue.

For the most part the amount of stroma was slight, but even in a single section areas were encountered in which there were considerable connective tissue and few, if any, tumour cells (Cases V and VI). Although the finding was most pronounced in the region of the blood vessels, strands of collagen without apparent relationship to vessels were

sometimes seen passing throughout the tissue. They were more apparent in Cases II and VI, particularly in the latter.

According to Elvidge, Penfield and Cone,[2] medulloblastomata without pattern formation are rare; of the configurations described, pseudo-rosettes are the most common. In the present series, in only one case (Case IV) were appreciable numbers of these structures found. Occasionally, in Cases I and II, the cells were arranged in small clumps; lobulation was also evident in some areas of the tumour in the former case. In a few of the cases there was a slight tendency for the cells to orientate themselves either in long columns or with respect to strains of connective tissue or to the walls of vessels.

In only two cases (III and VI) were many mitoses found. Moderate numbers were present in Cases I, V and VII. There were few in Cases IV and VIII and none in Case II.

Some karyorrhexis was detected in almost all specimens. It was most apparent in Case VI, in which it was associated with an increase in the amount of connective tissue stroma.

In one instance (Case IV) it was possible to compare the appearance of the original operation specimen with that of two metastases obtained at post-mortem examination eighteen months later. One of these metastases was found on the floor of the third ventricle; the other was a small plaque in the pia-arachnoid on the under aspect of the right frontal lobe. In the interval between operation and autopsy the patient had had two courses of deep X-ray therapy. The histopathological picture in the case of the ventricular metastasis was similar in all respects to that of the original tumour, except that pseudo-rosettes were even more common. In contrast, in the pial plaque considerable diminution in the number of tumour cells and very great hypertrophy of connective tissue were apparent (Figure IV). The nuclei of some of the tumour cells were slightly shrunken and irregular in outline, and stained more deeply than usual. Mitoses were rare. Many fibroblasts, with darkly staining, long, spindle-shaped nuclei, were present. Thick strands of collagen surrounded small clumps of tumour cells; in many places thinner strands of fibrous tissue separated individual cells.

Case IX.

At first sight the histopathological appearances in Case IX were similar to those in the previous cases. Detailed examination, however, revealed a number of differences. For instance, the predominant cells were slightly larger and their cytoplasm was better defined (Figure V). The nuclei were a little more vesicular and were round rather than oval in shape. (In the other cases a large proportion of oval-shaped nuclei was present.) Occasional nuclei had a well-defined nucleolus. In addition, small, round cells with densely staining nuclei similar to those described in the previous cases were present, but in much greater proportion. Some of these were scattered between the principal cells; others formed large aggregations, especially in relation to hæmorrhages. The tumour cells had a pronounced tendency to arrange themselves around vessels (Figure VI). Mitoses were very uncommon.

In comparison with the earlier cases, the tumour was much more vascular and the vessels were considerably larger (Figure VII). Their walls were thicker and the collagen supporting the endothelial cells was hyalinized. Numerous minute hæmorrhages were present. Except in the region of the blood vessels, the connective tissue stroma was almost entirely absent. In rare instances sparse reticulum fibres could be detected running between adjacent blood vessels. Owing to the lack of stroma the tumour was very friable, and much difficulty was experienced in preventing frozen sections from breaking up in the course of being stained.

Discussion.

Sex and Age Incidence.

In the eight cases of medulloblastoma included in this series, six of the patients were males and two were females. The average age on admission to hospital was 19·4 years. The youngest patient was aged eight years and eight months, the oldest was aged forty-seven years. Two of the cases occurred in the first decade, four in the second, one in the fourth and one in the fifth. The patient in Case IX was a female, aged thirteen years. A comparison of these findings with those of earlier investigators is embodied in Table I. Cushing[3] stated that medulloblastomata were three times more frequent in males than in females. His figures and those of others, however, show a proportion of only two to one (Table I). This error has been repeated in later papers—for example, those of Cutler, Sosman and Vaughan[4] and Knight.[5]

Duration of Symptoms before Admission to Hospital.

In my cases the duration of the history before admission to hospital varied from three weeks to fifteen months, the average being 4·9 months (Table II). The duration of symptoms in Case IX was three weeks. In Bailey and Cushing's[1] series of 29 cases the shortest pre-operative history was sixteen days and the longest three years, the average being 7·65 months. The average duration of pre-operative symptoms in 22 cases of Elvidge, Penfield and Cone[2] was five months; in no instance were the pre-operative symptoms of longer duration than twelve months. In Cutler, Sosman and Vaughan's[4] series of 20 cases, the shortest preadmission history was six weeks and the longest five years, the average being 11·2 months. In 22 cases of Elsberg and Gotten,[6] the average duration of pre-operative symptoms was 5·1 months; the shortest history was three weeks, the longest two years.

Symptomatology and Findings on Physical Examination.

Study of the symptoms and signs in all nine cases showed that they fell naturally into two groups—namely, those indicative of increased intracranial pressure, and

TABLE I.

Analysis of Sex and Age Distribution of 168 Cases of Medulloblastoma.

Authors.	Number of Cases.	Male Patients.	Female Patients.	Age Distribution in Decades.							Youngest Patient. (Age in Years.)	Oldest Patient. (Age in Years.)	Average Age on Admission to Hospital. (Years.)
				1st.	2nd.	3rd.	4th.	5th.	6th.	7th.			
Cushing	61	39	22	39	12	7	3	—	—	—	2·0	38	11·75
Roussy, Oberling and Raileanu	13	—	—	3	7	2	—	1	—	—	6·5	41	16·7
Elvidge, Penfield and Cone	28	19	9	10	4	7	1	3	—	—[1]	4·0	50	19·0[1]
Cutler, Sosman and Vaughan	20	14	6	3	10	2	4	—	—	1	5·0	65	20·8
Elsberg and Gotten ..	23	14	9	15	3	2	2	1	—	—	4·0	50	14·3
Brody and German ..	15	9	6	7	7	1	—	—	—	—	1·4	23	10·6
Swan	8	6	2	2	4	—	1	1	—	—	8·7	47	19·4
Totals	168	101	54	79	47	21	11	6	—	1	—	—	16·1

[1] Refers to 25 out of the 28 cases.

TABLE II.

Analysis of Duration of Symptoms before Admission to Hospital, Survival Periods, Provisional Diagnosis, Treatment and Cause of Death.

Case Number.	Duration of Pre-Admission History. (Months.)	Survival Period from First Symptoms. (Months.)	Provisional Diagnosis.	First Operation.	Second Operation.	Deep X-ray Therapy.	Survival Period After First Operation.	Cause of Death.
I	2	2½	Cerebral tumour.	—	—	—	—	Increased intracranial pressure.
II	15	16	Carcinoma of stomach.	—	—	—	—	Increased intracranial pressure.
III	¾	3¾	Right cerebellar tumour.	Suboccipital craniotomy (two stages). Partial excision of tumour.	—	1 course.	2¾ months.	Increased intracranial pressure.
IV	¾	19½	Cerebral tumour.	Suboccipital craniotomy. Excision of most of tumour.	Size of decompression opening increased.	2 courses.	18 months.	Meningitis.
V	14	24	Cyclical vomiting.	Suboccipital craniotomy (two stages). Majority of tumour excised.	Attempt to promote pathway for cerebro-spinal fluid.	1 course.	8¾ months.	Meningitis.
VI	1½	3½	Cerebral tumour, subdural hæmatoma.	Suboccipital craniotomy. Partial excision of tumour.	—	—	1⅔ months.	Increased intracranial pressure.
VII	4	16	Tuberculous caries of the dorsal part of the spine. Tuberculous meningitis.	Suboccipital craniotomy. Partial excision of tumour.	—	1 course.	11 months.	? Hæmorrhage into tumour.
VIII	1½	3½	Intracranial neoplasm.	Suboccipital craniotomy. Partial excision of tumour.	—	—	1½ months.	Meningitis.
IX	¾	3¾	Post-meningitic state. Intracranial tumour. Subarachnoid hæmorrhage. Meningitis.	Suboccipital craniotomy. Biopsy.	—	—	1 day.	Post-operative hæmorrhage.

those due to interference of the tumour with the functions of the cerebellum and of adjacent structures such as the brain stem. With the exception of Case III, the former group always preceded the latter.

Headache, vomiting and papilloedema occurred in all nine cases. Headache was usually severe in intensity and intermittent in character. In Cases I, II, III and VI, however, it eventually became more and more frequent until it was continuous. In two instances (Cases IV and VIII) it was worse when the patient awoke in the morning; in one (Case VI) it was worse at night. One patient (Case I) complained that her headache was intensified by straining, another (Case IV) that it became worse on assumption of the erect posture.

With the exception of Case IX, there was no apparent relationship of vomiting to the taking of food. In four instances (Cases IV, VI, VII and VIII) vomiting occurred when the patient awoke in the morning. In Case V the attacks of vomiting were cyclical in nature. Except in Case VII, vomiting was not preceded by nausea.

The degree of papilloedema was pronounced in Cases IV, VII, VIII and IX, moderate in Cases V and VI, and slight or not determined in the remainder. In four instances (Cases III, V, VII and VIII) papilloedema was more severe in the left eye than in the right; in one (Case II) the reverse was the case; and in the remainder, either it was equal on the two sides or else no information was available. Only three patients (Cases I, II and VIII) complained of failure of vision; of these, two were adults and one was a youth.

In Case IX, on the patient's first admission to hospital, papilloedema was absent. It was apparently on this account that an error of judgement was made and the patient was sent home. It should be emphasized that papilloedema is not an inevitable accompaniment of increased intracranial pressure (van Wagenen,[7] Martin and van Bogaert,[8] Hinds Howell[9] and Grant, Webster and Weinberger[10]). Of 145 verified cases of intracranial tumour, van Wagenen found that in 11·7% "choked" disk was absent on the patient's admission to hospital. Grant, Webster and Weinberger reported that in 158 verified cases of cerebellar tumour papilloedema was present in 126 instances and absent in 15; in the remainder the finding was not recorded or was equivocal.

Of the other symptoms and signs of increased intracranial pressure, drowsiness occurred in all of the cases except IV and VIII; bradycardia manifested itself in Cases V and VII; and diplopia was present in Cases IV and VIII.

Except in Cases II and VII, the skull was radiologically examined. Confirmatory evidence of increased intracranial pressure in the form of prominence of gyral impressions, or separation of the cranial sutures, or both, was elicited in Cases IV, V, VIII and IX.

Lumbar puncture (as a diagnostic measure) was performed in Cases II, III, VI, VII and IX. The pressure of the cerebro-spinal fluid was found to be increased only in Case VII (250 millimetres of water). Lumbar puncture was repeated in Cases II and IX a fortnight and two months later respectively. In both cases the pressure was increased; in the latter it was 340 millimetres of water.

For the most part there were no significant changes in the composition of the cerebro-spinal fluid. In Case IX the amount of protein (45 milligrammes per 100 cubic centimetres) was at the upper limit of normal. In view of the proximity of the tumours to the fourth ventricle, increases in protein content would not have occasioned surprise. Fremont-Smith,[11] however, found that about 50% of patients with gliomata of the cerebellum and fourth ventricle had normal protein values in the lumbar cerebro-spinal fluid. The chloride content of the cerebro-spinal fluid was decreased slightly in Cases III and VII. According to Fremont-Smith, such decreases are nearly always a reflection of decreases in plasma chloride level, probably brought about by vomiting.

Of the symptoms and signs attributable to cerebellar dysfunction, the most common were muscular incoordination associated with atonia and asthenia. They were recorded in all cases except VI and VIII. In Cases III and IX the right upper and lower limbs were affected, and in Cases I, V and perhaps II, all four limbs were involved. In Cases IV and VII the legs and right arm respectively were affected.

Vertigo occurred in Cases I, II, VII, VIII and IX. Nystagmus was recorded in Cases I, II, V and IX. In

Case II vertical nystagmus was present; according to Grant, Webster and Weinberger[10] this finding is often indicative of involvement of the cerebellar vermis. Neither nystagmus nor vertigo was of frequent occurrence in Cushing's[2] series. Tinnitus was complained of in Cases I and VIII.

Neck rigidity, together with the presence of Kernig's or Brudzinski's sign, was present in two cases (VII and IX), probably owing to herniation of the cerebellar tonsils beneath the arch of the atlas. Anorexia occurred in three instances (Cases II, IV and VII). In two cases (II and VII) the plantar reflexes were extensor. Of less common occurrence were "shivering" attacks (Case I), evening pyrexia (Case III), inclination of the head (Case V), paresis of the upper movements of the eyes and photophobia (Case VII) and hiccup (Case IX). Paresis of the upper movements of the eyes is considered by Brody and German[12] to indicate invasion by the tumour of the aqueduct of Sylvius.

Provisional Diagnosis.

The provisional diagnoses (Table II) tell their own story. It is suggested that a diagnosis of "cyclical vomiting" (Case V) should be made only after detailed neurological, ophthalmological and X-ray examination has given negative results. Persistence of symptoms should lead to reexamination at intervals. The symptoms were attributed to a lesion of the gastro-intestinal tract in Cases II and VII. In the former, a diagnosis of carcinoma of the stomach was made; in the latter, appendicectomy was performed prior to the patient's admission to hospital.

Treatment.

Two patients (Cases I and II) received symptomatic treatment only; all of the remainder were treated surgically (Table II). In Cases IV and V radical extirpation was carried out, while in Cases III, VI, VII and VIII partial removal was effected. Excision was limited to a small piece for biopsy in Case IX. Second operations were performed in Cases IV and V, in the former in order to increase the size of the decompression opening, in the latter in the hope of promoting a freer flow of cerebrospinal fluid between the fourth ventricle and the subarachnoid space.

A course of deep X-ray therapy was administered in Cases III, IV, V and VII about three to six weeks after operation. In Case IV a further course of irradiation was given, about a month after completion of the first. The total dose in Case VII was 5,940 *r*; no figures with regard to dosage are available in the remainder of the series. In all cases, only the site of the tumour was irradiated.

Of the patients treated by partial or radical extirpation followed by Röntgen therapy (Cases III, IV, V and VII), the shortest post-operative survival period was two and three-quarter months, and the longest eighteen months, the average being 10·1 months.

In twelve cases reported by Bailey, Sosman and van Dessel,[13] in which operation was followed by radiotherapy, the average survival period after operation was thirty-four months, and in eighteen recorded by Elsberg and Gotten[6] it was eighteen months. In six similar cases described by Brody and German,[12] three patients, reported previously by Tracy and Mandeville,[14] had an average post-operative survival period of thirty-three months (two were alive and well at the time of the report), and three others had an average post-operative survival period of 16·6 months (all of these were alive and well). Sachs, Rubinstein and Arneson[15] recorded five cases in which radical extirpation was followed by Röntgen therapy; the average post-operative survival period was 30·2 months (three patients were still living at the time of the report). The average survival period after operation in six cases described by Tarlov[16] was fourteen months (five of the patients were dead at the time of the report; three of them did not live longer than six months). In seventeen cases reported by Elvidge, Penfield and Cone,[3] there were four post-operative deaths; six patients died after an average interval of two years (one lived five years); four were alive, the average post-operative survival period being 3·3 years (one was alive and well seven years after operation); three patients could not be traced.

Cutler, Sosman and Vaughan[4] analysed the results of treatment in 81 cases, 20 of their own and 61 described previously by Cushing.[2] There were 20 post-operative fatalities and three deaths without operation or irradiation. The average post-operative survival period of fourteen patients treated by operation alone was 5·6 months. In 42 cases treated by operation and irradiation, the results were dependent on the degree and extent of Röntgen therapy; in 16 in which irradiation was inadequate, the average post-operative duration of life was 15·9 months; in five in which irradiation was confined to the cerebellar area only, it was 17·0 months; in nine in which irradiation was given to the cerebellar area and spine, it was 18·7 months; and in twelve in which the entire spine and ventricular system were irradiated, it was 28·2 months. Two patients treated by deep X-ray therapy without operation had an average survival period of 19·5 months. In the entire series of 81 cases, only three patients had survived for five years or more, and only one of these was apparently free from the disease at the time of the report.

The foregoing statistics emphasize the importance of adequate post-operative irradiation. Therein lies the main criticism of the treatment adopted in the present series. In all four cases in which Röntgen ray therapy was administered after operation, it was confined to the cerebellar area only. Moreover, apart from Case IV, only one course of irradiation was given. Cushing,[2][17] Bailey[13] and Tracy and Mandeville[14] have stressed the fact that post-operative deep X-ray therapy of the entire cerebrospinal axis is essential in the treatment of medulloblastoma. Cushing[2] and Cutler, Sosman and Vaughan[4] have drawn attention to the importance also of repetition of irradiation at intervals, to ensure that all tumour cells are killed or sterilized, even in the absence of existent symptoms. In these respects the Röntgen ray therapy administered in the present series must be looked upon as inadequate.

Cause of Death.

The commonest causes of death were increased intracranial pressure (Cases I, II, III and VI) and meningitis (Cases IV, V and VIII) (Table II). Two of the patients (Cases III and VI) died from the former cause, despite surgical interference, and despite the fact that in one (Case III) deep X-ray therapy was given. With regard to meningitis, it may be mentioned that in two of the three cases (IV and V) it followed wound infection subsequent to a second operation. Between the first and second operations deep X-ray therapy had been administered; probably this had led to devitalization of the tissues of the scalp. In Case VII death was attributed to hæmorrhage into the tumour. According to Globus and Sapirstein,[19] however, such a cause of death is exceedingly uncommon. That death occurred in Case IX as a result of post-operative hæmorrhage subsequent to biopsy does not occasion surprise, when the pronounced vascularity of the tumour revealed on pathological examination is remembered. If the degree of vascularity could have been foretold, probably the best treatment would have been decompression followed by adequate irradiation.

Pathology.

The nature of the principal cells of medulloblastomata has been a matter of considerable discussion. Bailey and Cushing[1][20] and Bailey[21][22] contended that they were bipotential cells or "medulloblasts", capable of development into either spongioblasts or neuroblasts, both of which they claimed to have found in their sections. On the other hand, Penfield[23] was unable to identify neuroblasts in his series of medulloblastomata. He considered that the main cells morphologically resembled apolar spongioblasts. However, in a series of 21 cases studied by Elvidge, Penfield and Cone,[3] spongioblasts were demonstrable in five, and neuroblasts in three. Roussy, Oberling and Raileanu[24] believed that the majority of cells were neuroblasts in various stages of development, but admitted that occasional

spongioblasts were present also. Stevenson[23] and Stevenson and Echlin[36] considered that the tumours were actually neuroblastomata derived from the granular layer of the cerebellum. They suggested that these neoplasms should be renamed "granuloblastomata". In a recent investigation of the fœtal nervous system, Kershman[27] could find no evidence of the presence of "indifferent" cells, bipotential cells or medulloblasts in the cerebrum or spinal cord; such cells were demonstrable, however, in the external granular zone of the cerebellum. The confinement of medulloblastomata to the cerebellum would thus be explained. It should be pointed out, however, that Tuthill[29] has found a much more widespread distribution of medulloblasts throughout the central nervous system of infants. In the present cases, as in those of Cox,[20] neither neuroblasts nor spongioblasts could be identified. However, both the material and the staining methods employed were limited.

With regard to the nature of the remaining cells, it was concluded that some were degenerating tumour cells with pyknotic nuclei, and that others were of connective tissue origin. Similar observations have been recorded by Elvidge, Penfield and Cone.[3] As invasion of tumour cells leads frequently to a low-grade inflammatory reaction (Ewing[30]), it seems probable that a proportion of the cells were lymphocytes. Rarely cells resembling oligodendroglia were encountered; similar cells have been reported by Bailey.[21] Multinucleated giant cells, as recorded by Russell,[31] were never seen.

As has been mentioned already, in Case VIII numerous fibrillary astrocytes were scattered throughout the tumour. Similar cells have been noted by Bailey and Cushing[1] and Gagel.[22] A pronounced astrocytic stroma in medulloblastomata has been reported also by Cox,[20] who believed that it was formed by tissue astrocytes associated with the vascular system. He pointed out that no astrocytes were detectable in the metastases of medulloblastoma growing in non-glial tissue, such as the subarachnoid space.

There was a moderate degree of variation in the cellularity, vascularity, amount of stroma and number of mitoses in the eight tumours which comprised the series. Cutler, Sosman and Vaughan[4] attempted to use the above-mentioned factors in the determination of the grade of malignancy of these tumours, but without success. In the present series also correlation was absent.

Increase of collagen in medulloblastomata is said to result when the tumour invades the *pia mater* (Bailey,[18] Roussy, Oberling and Raileanu,[34] Brody and German[32]). It is conceivable, however, that local tumour necrosis with involvement of the blood vessels may also be a factor leading to multiplication of collagen. Brody and German stated that some parallelism seemed to exist between the chronicity of symptoms and the quantity of connective tissue stroma present.

Metastases were detected only in Case IV. It should be stressed, however, that autopsy was carried out in only five of the cases, and in these it was confined to the cranial cavity. In Case VII there was suggestive clinical evidence of spinal metastases.

Although in symptomatology and anatomical situation the tumour in Case IX behaved as a medulloblastoma, histopathological appearances were atypical. The tumour bore a considerable resemblance to the neoplastic foci (Case I) described by Globus and Kuhlenbeck[33] under the title of *spongioblastoma ependymale*. Two similar cases (numbers 5 and 6) have been recorded by Bodechtel and Schüler,[24] in which the diagnosis lay between medulloblastoma and ependymoma. Globus and Kuhlenbeck mentioned that their specimens were extremely similar to one reported by Alexander[25] as a medulloblastoma of the lateral recess of the fourth ventricle. Alexander noted that in many places his tumour showed an ependymoid arrangement, but because of the absence of blepharoplasts and of continuous protoplasmic ependymal linings, he preferred to call it a medulloblastoma. The present specimen closely resembled that of Alexander, not only in its arrangement, but also in its pronounced vascularity and absence of stroma; in contrast with the cases of Alexander and of Globus and Kuhlenbeck, however, mitoses were uncommon.

When all these observations are taken into account, it seems probable that other examples of *spongioblastoma ependymale* may have been classified erroneously as medulloblastomata. It is suggested that restudy of the various series of medulloblastomata reported previously may bring forth other specimens. Furthermore, is it not conceivable that some of the tumours reported earlier as cerebral "medulloblastomata" (Bailey and Cushing,[20] Cushing,[1] Cox[20][20]) also belong to this category?

Summary.

Of eight patients suffering from medulloblastoma, six were males and two were females; the average age on admission to hospital was 19·4 years, and the average duration of symptoms prior to admission to hospital was 4·9 months. A case of *spongioblastoma ependymale* is described, the patient being a female, aged thirteen years; the duration of symptoms prior to her admission to hospital was three weeks.

Medulloblastomata are twice as common in males as in females, not three times as common, as Cushing[2] states.

With one exception, symptoms and signs of increased intracranial pressure always preceded those due to dysfunction of the cerebellum and adjacent structures.

Papillœdema is not necessarily a concomitant of increased intracranial pressure.

X-ray examination of the skull was of assistance as a diagnostic measure in four out of seven cases.

The pressure of the cerebro-spinal fluid was raised in three out of five cases in which it was estimated; the composition of the fluid showed no significant changes.

Cerebellar dysfunction manifested itself most commonly as muscular incoordination associated with atonia and asthenia. Vertigo occurred in five cases and nystagmus in four.

The average survival period in four cases of medulloblastoma, in which treatment was by partial or radical excision followed by deep X-ray therapy, was 10·1 months.

The importance of repeated post-operative irradiation of the entire cerebro-spinal axis is emphasized.

The commonest causes of death were increased intracranial pressure (four cases) and meningitis (three cases).

The nature and origin of the cells of medulloblastomata are discussed.

Variations in the cellularity, the vascularity, the amount of stroma and the number of mitoses did not appear to be of value in the determination of the grade of malignancy in the eight cases of medulloblastoma studied.

Local necrosis with involvement of blood vessels may be a factor leading to increase of collagen in medulloblastoma.

Metastases were detected in only one of five cases of medulloblastoma in which autopsy was performed. Post-mortem examinations, however, were confined to the cranial cavity. There was suggestive clinical evidence of spinal metastases in one case.

In comparison with those of medulloblastomata, the principal cells of the *spongioblastoma ependymale* studied were larger and rounder and had a more vesicular nucleus. The tumour was much more vascular and the vessels were considerably larger. The tumour cells had a pronounced tendency to arrange themselves around vessels. Connective tissue stroma was almost entirely absent.

It is suggested that other examples of *spongioblastoma ependymale* have been classified erroneously as medulloblastoma.

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Addendum.

Since the submission of the foregoing paper for publication, an additional article by J. H. Globus and H. Kuhlenbeck, entitled "The Subependymal Cell Plate (Matrix) and its Relationship to Brain Tumors of the Ependymal Type", has appeared in *The Journal of Neuropathology and Experimental Neurology*, Volume III, Number 1, January, 1944, at page 1.

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THE DOCTOR AND THE PRE-SCHOOL CHILD.[1]

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HAVING been invited to address you on the subject of the pre-school child, I feel that you may expect me, like the shoemaker, to stick to my last of psychiatry; but who can accurately limit its implications? Certainly not the psychiatrist, who realizes that they are bounded only by horizons of behaviour impinging on every specialty.

Our profession has for years leaned heavily on certain phrases which, though intrinsically meaningless, have satisfied our urge to a pigeon-hole nomenclature. When in doubt, we have found comfort in such conceptions as constitutional diathesis or familial influence, or we employ the term "stress"—a blessed word which has helped thousands of our profession when confronted by the necessity to explain a cause. It may be used to account for hyperpiesia, gastric ulcer or anxiety neurosis. A few years ago it was believed to be the reason why so many professional gentlemen acquired "general paralysis of the insane". Today in psychiatry we are commencing to glimpse the truth. Those vague, mysterious diatheses, constitutions and familial tendencies and stresses, are resolving themselves into clear-cut entities—habit patterns of inefficiency impressed by environment in the early years which for convenience we call the pre-school age. I believe that the general physician and maybe the surgeon are already commencing to explore the possibilities of this field.

In psychiatry the reasons for a belief in the importance of the early formative period are many and varied. During the last decades both medical and lay psychologists have explored the realms of dynamic psychology, tracing habit patterns and emotional trends further and further into the realms of infancy. Whereas twenty years ago the works of Freud caused lively and bitter comment, today much of his thought has been so thoroughly absorbed as to be respectable. We have ceased to wince at the idea of infantile sexuality or autoeroticism. We find ourselves using the conceptions of Adler, MacDougall, Watson, Rivers, as unnamed and essential entities. In other words,

[1] Read at a meeting of the Queensland Branch of the British Medical Association on May 5, 1944.

their dynamic theories have been absorbed. We regard life patterns as a chain of cause and effect. We are forced to attribute the greatest importance to infancy, which inevitably creates a bias which time and circumstance later magnify.

Recently nature has staged an epoch-making experiment on the question of nurture which should go far to convince our profession of the importance of early environment in mental and physical development. Professor Gessel, of Yale, has published an account of a human wolf-girl, who was discovered in 1920. Kamala (that was her name) was aged seven years when found, and although she was apparently of innately normal mentality, she showed such mental retardation that six years were required for her to learn thirty words or to be able to undertake simple errands. Kamala at the age of seven years had acquired wolf characteristics, howling at intervals, killing birds, eating offal, walking and running on all fours, sleeping by day, roaming by night. To all intents and purposes she was a wolf. It is interesting to note the concomitant physical changes—long hands, enlarged great toe, broadened shoulders, straight spine, callosities of the palms, heels and knees, hyperflexible jaws, blood-red buccal mucosa *et cetera*.

Such changes draw attention to the possible changes which may have ensued in such common findings as avitaminosis, sinus disease, faulty posture of childhood, and which become irreversible. Moreover, a new twist has been given to this problem by the discovery of shock therapy. Though often the therapeutic results border on the miraculous, there is a regrettably large number of patients who resist treatment, or in whom the beneficial results are so transient that a maintenance dose is needed to keep them within the bounds of normality. The cause of this therapeutic lag lies in the fixation of habit patterns at a level which does not permit the patients to face an environment which the psychiatrist is unable to control. We see that the fixations of early childhood are so strong that convulsion treatment cannot reverse them. Also, the practising psychiatrist is increasingly aware that when he searches for the cause of nervous disorder, he must blame, not the immediate present, but the upbringing in infancy. Moreover, as has been pointed out by those in a position to know, the incidence of nervous and mental disorder in our so-called civilized society is increasing at a rate which staggers the thoughtful. It is questionable whether we can train a sufficiency of psychiatrists to cope with the increase. Few realize the economic and social immensity of the problem. There are more mental than general hospital beds in our community. Our mental hospitals are hidden in the country. We cannot visualize their inroads on our public purse and the drain upon our pool of labour. Nor do we consider the vast amount of delinquency, crime, prostitution and other maladjustment directly traceable to faulty upbringing. If a large percentage of nervous and mental invalidism is due to maladjustment during the plastic or formative years of early childhood, then the doctor must press for energetic research and increased attention to the child of pre-school age.

For the future of the race, the problem of nervous and mental invalidism is much more important than that of cancer, which largely concerns the old and therefore the less socially useful individuals. We press for large cancer institutes replete with fabulously costly X-ray and radium equipment; but our profession is strangely silent about the need for institutes to study and deal with those aberrations of infancy which through progressive and cumulative sequelæ bring a host of maladies in adulthood.

There is still another important aspect of the problem of the pre-school child which closely affects every doctor. With that painful slowness of receptiveness to new thought which seems inevitable in the mass mind, we are waking up to the tragedy of a dying Australian race. Every medical and social problem fades into insignificance before that of depopulation. Our profession is in a position to give invaluable and unbiased opinions as to why our national birth rate is so low. The doctor sees men and women stripped of their camouflage of social pretence. Whilst there may be in some cases chemical and metabolic factors underlying a lowered fertility, there is a far more serious element in parental psychology. Our young mothers and fathers are magnificent material whose horizon is the four to six child family. The advent of the first or second child brings psychological nausea. The mother is confined day in, day out in a box house and attenuated garden. Lacking help of any description, she must be cook, washerwoman, nursemaid, errand boy, seamstress and "glamour girl", and everywhere she goes, as with Mary and the little lamb, the babe or toddler must follow her. Then as she begins soberly to count up her blessings of parenthood, she realizes that her baby may be just cannon fodder for a new war or may be "on the dole" in an industrial slump. If she decides to restrict her family, we cannot blame her; but we do castigate those purblind critics who ask her to carry on in the manner of our grandparents. They infer that large families were the rule then and should be still the rule, forgetting that we live in a new world of crippling taxation, women in industry, motor-car infested streets and higher standards of necessities. Our belauded ancestors, faced with the realities of today, would have also reacted by adopting contraception.

It must be stressed by our profession that there is no possibility of permanent improvement in the birth rate until much more is done for the young mother to guide her over the early difficult years. Words, advice, verbal tonics and honeyed phrases are useless. She needs action in the shape of better pre-school facilities—crèches for children of the working mother, kindergartens for those of every mother, together with supervised playing fields during the holidays. It will be said that we may not be able to stand the cost involved. So long as there is a motor-car on our roads, a barrel of beer in our breweries, a horse on the racecourse, we can afford it. In the interest of race safety we must afford it, were the cost ten times as high.

The doctor must urge the urgent necessity for a commission on depopulation, to include a complete review of all pre-school child facilities and their psychological implications. Furthermore, he must insist on action even at the cost of offending vested interest, Commonwealth or State susceptibilities. The depopulation is a first priority; whatever stands in its way must go to the wall. It has the urgency and the perils of a major war.

In the foregoing there is an insistence that the problem of the pre-school child must be closely studied, since it affects both race safety and physical and psychological health. One might adduce other reasons, including those of citizenship, morality and appreciation of æsthetics. This is not surprising, since the strength of any structure (including a nation) is based on the solidity of its foundations.

I shall now briefly outline some practical steps towards the realization of our goal.

Every Doctor Should Know Something of the Principles Underlying Child Development.

It is regrettable that, in spite of the increasing demands on our time for reading medical literature, we must insist on time spent in mastering at least the rudiments of child development and guidance. An excellent summary was published in THE MEDICAL JOURNAL OF AUSTRALIA of July 30, 1938, by Miss Christine Heinig, then principal of the Melbourne Kindergarten Training College and now Federal Officer for Pre-School Child Development. It is still accurate. She outlines the generally accepted technique for keeping the child in a safe and adequate environment, the necessity for allowing the child to "do for itself" and learn the fundamentals of the social virtues, the early understanding of responsibility, the provision of scope to learn with spontaneity and of an interesting and stimulating environment, the use of routine and rest periods, the use of success and encouragement. Miss Heinig makes the following statements:

> Learning from peers is more wholesomely digested than learning from preaching adults; for children social contacts from eighteen months on are desirable. Objective guidance can often best be given by someone

who is not a blood relation or emotionally involved. Biologically perfect parenthood does not also mean psychologically informed parenthood. Ability in child guidance is doubtless a set of acquired traits; therefore, parents need some help in this matter. Twenty-four hour guidance of a very young child is strenuous physically, and after the first few hours legitimately boring mentally. Parents doubtless will be and certainly can be expected to be really good, patient, friendly and companionable humans for a few hours of the day; but spells of freedom, especially for the mother, from the clinging and demanding toddlers are humanely necessary. The twentieth century small family, small home, small garden, busy household, have robbed our city dweller and often even our country dweller of the natural environment for child development that our grandmothers tell us was so perfect in their day. If we have really lost that good environment, then it might be possible to excuse the older generation for "naturally" thinking and occasionally expressing the idea that nursery schools are unnecessary frills and that children are better off at home, and their mothers with them.

It must be stressed that the young learn in kindergartens, through the medium of play, to coordinate sensation with motion, learning with emotion, the individual with the community, courage with normal fear, cleanliness and tidiness with normal dirt, honesty with natural greed, obedience with self-assertion, singing with instructive noisiness. Play is the universal cement which holds together and integrates the habit patterns and instincts in a manner which will determine the future type of personality and character.

The Doctor Should see a Kindergarten in Action.

It is always wise to see for oneself and not to depend on books or hearsay evidence. Every doctor in the metropolis and visitors from the outback have the opportunity of seeing a modern kindergarten in action. The Commonwealth Government is to be congratulated on having had the foresight to institute Lady Gowrie Child Development Centres in all the capital cities. These were to serve as models of the type of training necessary for the pre-school child. Each centre is in charge of a supervisor, who will welcome any medical practitioner who cares to attend. It is advisable to go in the morning in order to see the children at work. Facilities have been installed so that the onlooker can see the children without being seen. He is therefore able to judge the spontaneity of the play and not have the impression that something is turned on for his benefit.

If the doctor has the time, he will see the various types of play designed to foster the growth of character and to create community outlooks. At meals he will note the provision of lunch as part of a balanced diet. He cannot help but be impressed by the importance which is laid on the inculcation of good manners. He will be reminded that it is seemly to say grace before meals. The furniture, equipment and toys create an environment in which the natural inclination of the infant will have its freest play. The doctor may observe the sturdy nature of the toys, and it is profitable to contrast them with the rubbish which is all too frequently sold as toys for the general public. It is pleasing to note that at long last our authorities are waking up to the Commonwealth-wide need for more stringent regulations as to the type of toy which may be sold across a shop counter.

The Doctor Must Take Steps to Educate the Parent and the Public.

All authorities agree that parent education is vital. We must remember that, however efficiently a child is developed in a kindergarten, the training is for six hours a day and not every day. The remainder of the time is quite rightly spent at home.

The parents may be approached in many ways. The kindergarten supervisors see them as they bring their children to and from the institution. They are encouraged to form parents' clubs, and in a well-run kindergarten they do many "chores" to help in the beautification and efficiency of the centre. They may help in the kitchen, in providing comforts, in mending equipment and in other ways. The Australian Association for Pre-School Child Development provides a monthly newsletter to all parents who have children in kindergartens. This gives them hints and direction on the child problem. The Commonwealth Government has published an interesting series of pamphlets for parents, which deal with many important matters, such as diet and health generally.

Our Queensland State Government has lately become interested in the kindergarten problem, and is developing a scheme whereby parent education will be carried on through the agency of the voluntary Crèche and Kindergarten Association. It is felt that this education will proceed more energetically through a voluntary association than if the whole subject of pre-school child care became an entirely governmental prerogative. Furthermore, the voluntary association is conducting an annual convention, at which all who are interested in the pre-school child movement will be able to attend both for education and for discussion.

What Part Does the Doctor Play in the Proceedings?

The doctor should at least know the facilities which are available for parent education. This knowledge will serve to enhance his own efforts in this direction. He can advise parents where to send their children and where to obtain advice on child management, and he can undertake valuable propaganda in making the population "child-care-minded". In addition, he can advise the parents that they should listen in to kindergarten sessions, which are a regular feature of our national broadcasting station, and he can point out that parents would be well advised, if they cannot obtain the facilities of a kindergarten, at least to make sure that their child is not deprived of the use of "the kindergarten of the air".

It is hoped that in the future the doctor will do far more than I have indicated above. Parent education is so necessary it should be one of the functions of our profession to give addresses to parent clubs on a coordinated scale. We constantly hear the pessimist say that education of the adult is quite useless. Whilst this may be often true, we must never forget that the young parent is most impressionable at the commencement of his or her family life. We speak of a psychological moment. We should consider a psychological two-year period of early parenthood when education is possible and fruitful. We cannot afford to let this period pass without giving it the attention which it deserves.

The Doctor Should Stress More Medical Supervision of all Pre-school Children.

If we regard the pre-school child as living in a plastic age, in which the whole future mind and body functioning may be made or marred, then as doctors we should press for the complete medical supervision of all children during this period. One is not unmindful of the prophylactic work which has been done as a result of the activity of our association. Only the optimist would say that we might not have done more. It may be argued that this supervision of the pre-school population is the job for the Government. If this is the case, then we must not deplore a further whittling away of our work in a private capacity. Prior to the war a number of our general practitioners gave valued help and advice in kindergartens throughout the Commonwealth. The burden of wartime duties has unfortunately made these services practically non-existent. Should they not be revived, it is certain that our Government must take the matter in hand. In this connexion we note the following resolutions passed at the sixteenth session of the National Health and Medical Research Council in December, 1943:

> The Council recommends to governments that immediate steps be taken to extend the child hygiene section of each department to cover adequately the pre-school period; and that municipal authorities be encouraged by advice, supervision and financial assistance to establish nursery schools, kindergartens, playgrounds, and all the recognized methods of child care in the pre-school period.

ILLUSTRATIONS TO THE ARTICLE BY DR. CHARLES SWAN.

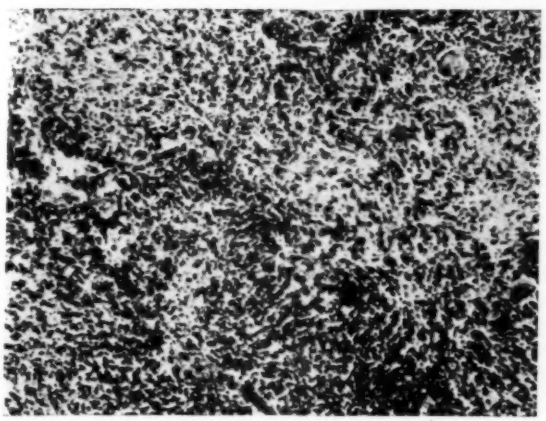

FIGURE I.
Medulloblastoma (Case IV). General arrangement of the cells of the tumour. Frozen section. Hæmatoxylin and eosin stain. (× 100.)

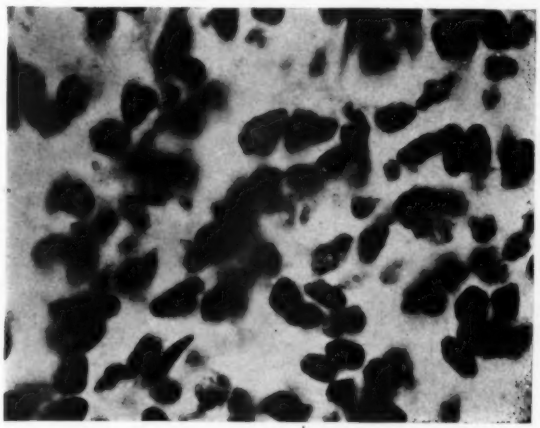

FIGURE II.
Medulloblastoma (Case IV). Higher power view of the tumour. Paraffin section. Nissl stain. (× 1,000.)

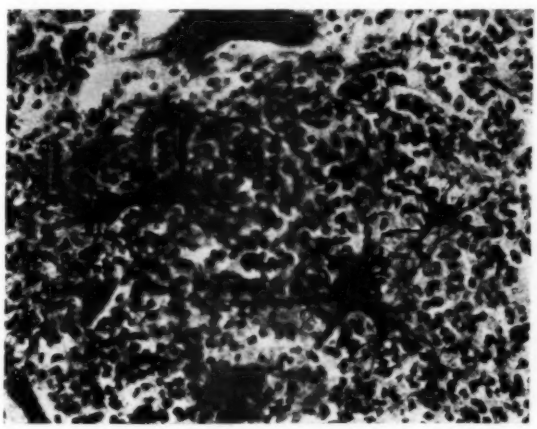

FIGURE III.
Medulloblastoma (Case VIII). Scattered fibrillary astrocytes in tumour. Frozen section. Cajal's gold sublimate method. (× 250.)

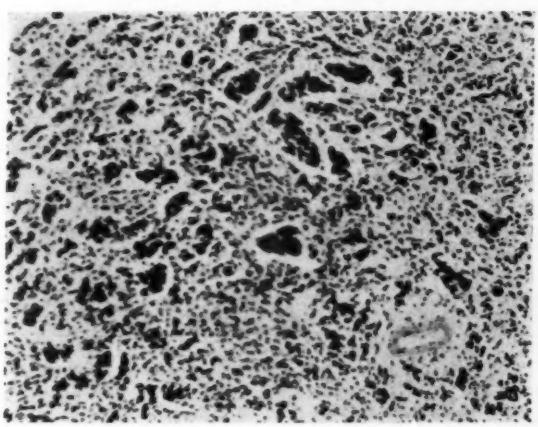

FIGURE IV.
Medulloblastoma—pial metastasis (Case IV). A few clumps of tumour cells are separated by large quantities of connective tissue. Paraffin section. Hæmatoxylin and eosin stain. (× 95.)

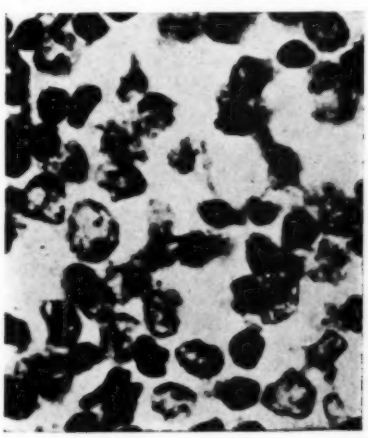

FIGURE V.
Spongioblastoma ependymale (Case IX). Character of cells. (Note the difference between the cells in this tumour and those in Figure II.) Paraffin section. Nissl stain. (× 1,000.)

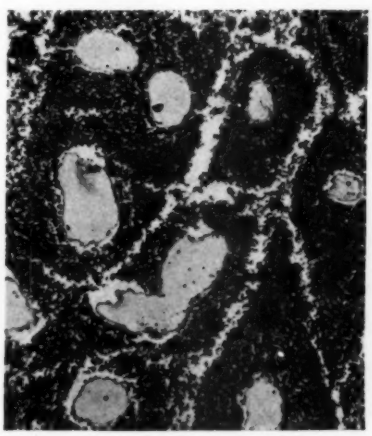

FIGURE VI.
Spongioblastoma ependymale (Case IX). Low power view to show arrangement of cells around vessels. Paraffin section. Hæmatoxylin and eosin stain. (× 60.)

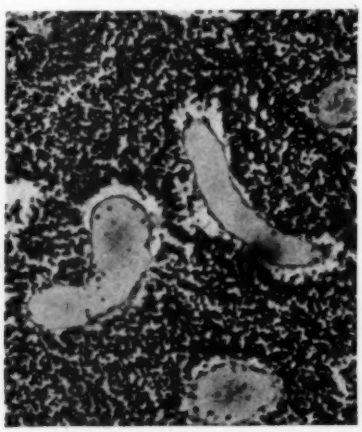

FIGURE VII.
Spongioblastoma ependymale (Case IX). Pronounced vascularity of tumour. Paraffin section. Nissl stain. (× 100.) Compare Figure 1 (same magnification).

ILLUSTRATIONS TO THE ARTICLE BY DR. JOHN MAYO.

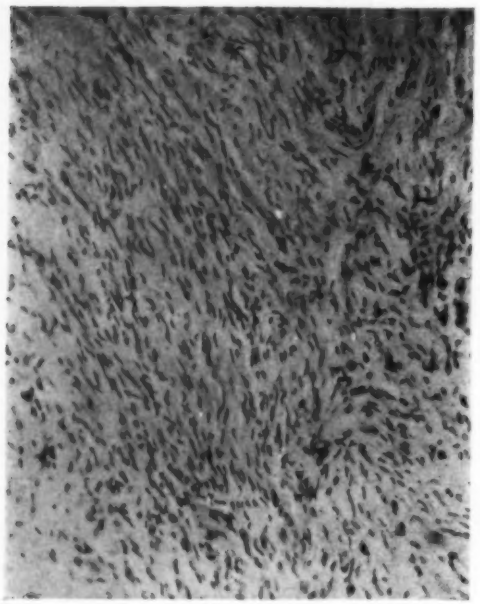

FIGURE III.
Microphotograph of section, × 40. The biopsy was taken eight weeks after treatment.

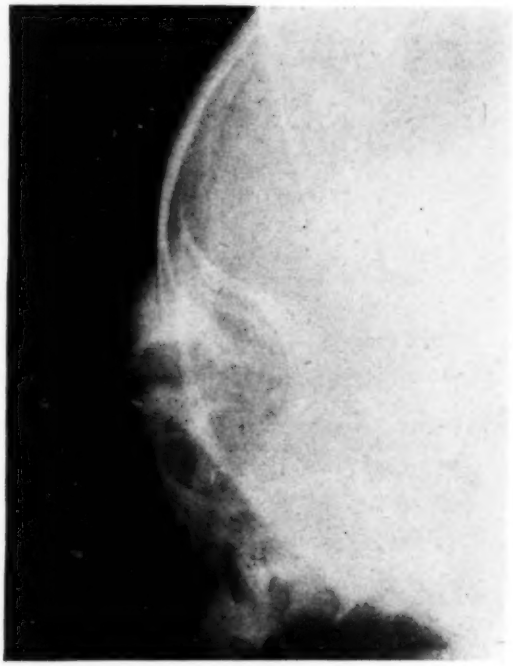

FIGURE IV.
Radiograph of the skull, August 16, 1939. This was the first X ray to show definite bony outgrowth. Taken before treatment.

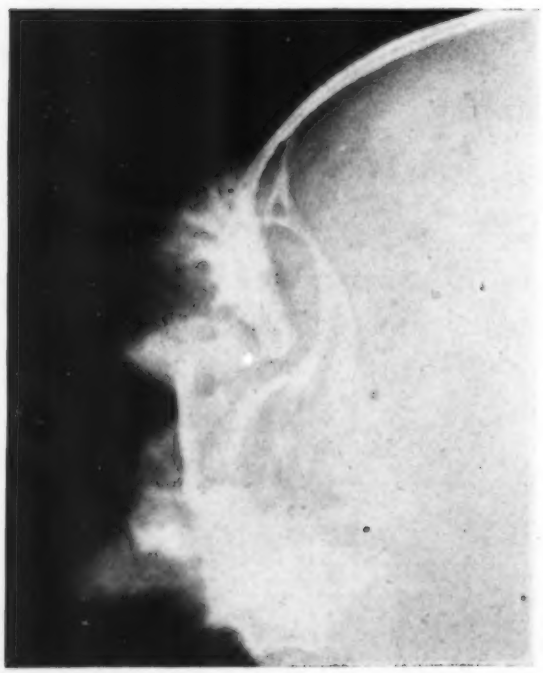

FIGURE V.
Radiograph, October 18, 1939, about six weeks after the completion of treatment. The bone masses are much more evident.

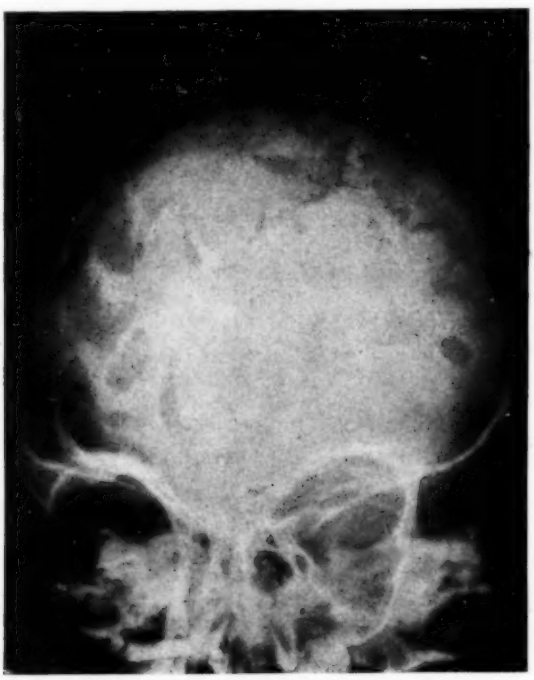

FIGURE VI.
Radiograph, April, 1944. No bony abnormality is apparent.

Each State department should provide the advice and supervision and, in particular, should prescribe and enforce standards.

In the sixth interim report presented by the Parliamentary Joint Committee on Social Security, dated July 1, 1943, the following remark is made:

> The extension of facilities for caring for young children, particularly those of pre-school age and during school age, and the children of mothers engaged in war industries, is desirable in the interests of the nation as a whole. This could best be done in cooperation with established child welfare organizations in the States under grants-in-aid by the Commonwealth.

In our own State the matter of the medical supervision of the pre-school child has received attention at the hands of the Crèche and Kindergarten Association. In view of our inability to obtain a satisfactory scheme for voluntary inspection of the pre-school child, there is no alternative other than to permit it to be a function of the Maternal and Child Welfare Department. This body has done excellent work in many directions and is keenly interested in the problem of the pre-school child.

The Doctor Should Join the Local Kindergarten Union or Association.

One must again stress the urgent need for parent education in any scheme which affects the pre-school child. We are faced with the vital question as to whether this shall be the prerogative of the State or be carried out in conjunction with voluntary enterprise. Whilst there is much to be said for wide governmental control, any such system has grave disabilities, in that it leads to a bureaucratic control which tends to be beyond criticism and is therefore ultimately undemocratic. We may state axiomatically that no system of government is perfect—indeed, perfection is possible only in a society of gods. At the best we must be content with a compromise. We need a system which is of sufficient size to be economical, but not so great as to be unworkable. It must be open, to admit the fresh air of criticism, and sufficiently closed so that it will not be swung by political opportunists. It would seem that the ideal will be best met by the close collaboration of voluntary, State and Commonwealth enterprises. Each should act as a brake upon the other, each should provide the element of criticism which is the life blood of a democracy.

It is contended that the doctor must take sides and be an active participator in the community arena. The problem of the pre-school child is vital. It concerns not merely the health of the nation, but its very existence. We must act resolutely and quickly. We must decide whether we shall allow the matter to meander on, on the time-honoured plan of *laissez-faire*, or ourselves become active participants in a well thought out plan of action. I have already indicated that the British Medical Association must take a lively interest in pre-school affairs. I should go further and suggest that every doctor should become a member of a crèche and kindergarten association. By this means, not only will he become aware of what is being done for the pre-school child, but he will help to create a wave of enthusiasm in favour of public-spirited bodies, which are doing their best to carry on in difficult circumstances. Moreover, such cooperation will be of great benefit in showing that voluntary enterprise has an efficient backing in our community.

Conclusion.

Milton, in "Paradise Regained", wrote: "The childhood shows the man as morning shows the day." I trust that I have said sufficient to indicate that we must not regard this prevision as a mere academic aphorism, but as a call to action. What we do for the pre-school child of today will determine the shape of the civilization of tomorrow.

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A. Gessel: "Wolf Child and Human Child", 1941.
C. Heinig: "The Training of the Pre-School Child", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, 1938, page 155.

Reports of Cases.

SARCOMA OF THE SKULL IN AN INFANT.

By JOHN MAYO, F.R.C.S. (Edinburgh), F.R.A.C.S.,
Honorary Associate Radium Therapist, Royal Adelaide Hospital.

THIS case is thought worthy of record for the following reasons: (i) the rarity of the lesion, (ii) the extreme youth of the patient, (iii) the mode of treatment, (iv) the apparently successful result. The exact nature of the tumour also affords a field for discussion.

Clinical Record.

A.W., a male child, aged three months, was admitted to the Adelaide Children's Hospital on July 26, 1939, with a swelling in the right zygomatic region. This was stated to have appeared one week before his admission to hospital and to have grown considerably during the week. The patient was a first child and labour had been normal; instruments had not been required for delivery. No information that appeared to be relevant was elicited from the family history.

While the patient was in hospital the mass continued to increase in size, and on August 22, 1939, he was referred to the radium clinic at the Royal Adelaide Hospital. At this time there was a swelling in the right zygomatic region extending to the lateral border of the orbit. It was firm and attached to bone and measured about four centimetres in diameter. Speaking from memory, I should say that the mass projected about two centimetres above the surrounding surfaces. There was no pain and no glands were palpable.

A discussion as to diagnosis and treatment took place. Skiagrams were available, and a tentative diagnosis of sarcoma was made. Remembering skull conditions I had treated at the Middlesex Hospital during my two years' work there, I suggested the use of a radium mould. The consultative committee sanctioned this mode of treatment. On account of the danger of dissemination, it was decided to delay biopsy until after irradiation.

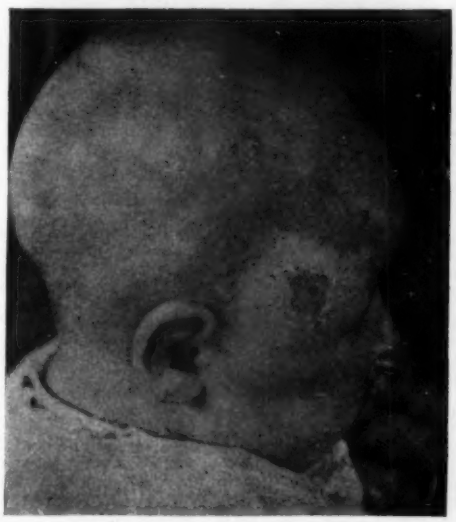

FIGURE I.
Photograph of the patient, October 2, 1939, about four weeks after completion of treatment. The tumour mass is well seen, showing slight scaling of the skin in the centre. Age, five months.

Eight days later I made and applied a Columbia paste mould, with the following factors: area, 6·0 centimetres by 6·0 centimetres; thickness or distance, 3·0 centimetres; filtration, equal to 1·0 millimetre of platinum. The mould carried a charge of 91 milligrammes of radium element; it was kept in place for 132 hours, giving a dosage of 12,012 milligramme hours and 4,200*r*. The dosage was based on

that for children I had treated at the Middlesex Hospital and elsewhere.

By September 11, 1939, slight erythema was present, and a week later a dry, erythematous reaction, described as "satisfactory", was noted. The antero-posterior measurement of the tumour was then 4·5 centimetres. A fortnight later the tumour appeared to be smaller, and scaling of the skin was present. Some doubt was expressed as to whether the anterior edge had received sufficient irradiation. On October 16 complete epilation of the area treated and of the right eyebrow was noted.

The patient was then referred back to the Adelaide Children's Hospital for a biopsy, which was taken a few days later. The histological findings, in conjunction with the radiological reports, will be discussed later.

On November 13 the antero-posterior measurement of the tumour was 3·5 centimetres and the vertical measurement 4·5 centimetres. By December 20 the swelling had almost disappeared. There was a small central patch of reddened skin with moist desquamation at the site of the biopsy. Some right internal strabismus was recorded. In February, 1940, practically no mass was palpable, and the child appeared well. Three months later the tumour had vanished, and slight atrophy and telangiectasis of the skin were present at the treated site.

Since then there has been no evidence of recurrence, and when he was last seen in February and March, 1944, over four and a half years after treatment, the boy appeared to be well; no tumour was palpable or visible radiologically, the skin was freely movable, and apart from slight scarring and epilation no abnormality was evident. The child was then five years of age, he was attending school, and his intelligence was stated to be up to the normal standard. An ophthalmological examination carried out at this time revealed that the visual acuity of both eyes was $^6/_9$; the media were clear; in the right eye slight pallor of the disk and slight pigmentary changes round the macula were present.

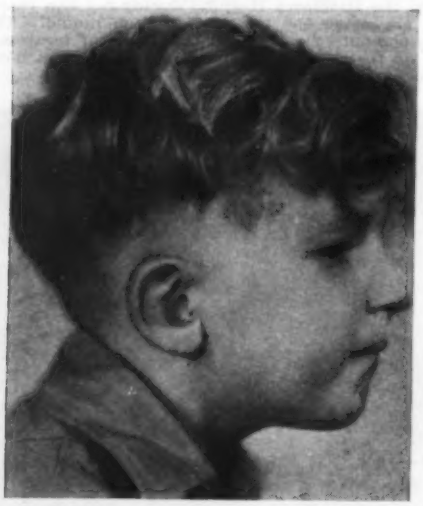

FIGURE II.
Photograph of the patient, April 22, 1944. No mass is present. There is slight scarring and epilation. Age, five years.

Pathological and Radiological Findings.

To return to the biopsy: this, it will be remembered, was taken two months after the application of the radium mould and when the tumour was in the early stages of disintegration. One would therefore not expect to find evidence of great cellular activity. The report of the pathologist of the Adelaide Children's Hospital read as follows:

> Section of pieces submitted show a fibrosarcoma undergoing a myxomatous change. There is nothing in the piece sectioned to suggest that the tumour is an osteogenic sarcoma, but this fact does not exclude the latter diagnosis. It may only be that not enough material has been submitted for section. The consulting pathologist has kindly inspected the section and concurs with the above report.

Dr. J. B. Thiersch, Neale Research Pathologist, and pathologist to the radium clinic, has recently examined and photographed the section. His report is as follows:

> The biopsy of the tumour, taken eight weeks after the irradiation, shows a tumour consisting of fibro-spindle cells with much interstitial substance. There are myxomatous areas in the periphery. There is definite arrangement of nuclei in rows. Small vessels are compressed and invaded by the tumour. Blood pigment is found intracellularly in fibroblasts in the centre of the tumour. Diagnosis: fibrosarcoma.

The radiological reports are from both hospitals. They seem to suggest a somewhat different diagnosis. The first is from the Adelaide Children's Hospital, and is dated July 26, 1939:

> Skull. There is a little increased density of the bone at the lateral aspect of the right orbit which apparently represents the bony swelling found clinically. It is difficult to state the nature of this swelling as it is impossible to obtain good bony detail.

The second report is also from the Adelaide Children's Hospital, and is dated July 29, 1939:

> The tumour is visible in the oblique films as a soft tissue swelling. There is no positive radiological evidence that the tumour is of bony origin.

The next report from the Adelaide Children's Hospital was made on August 16, 1939, just before the child was referred to the radium clinic; it is as follows:

> There is an area of dense bone on the lateral aspect of the right orbit and the appearance suggests radiating spicules. This has increased considerably since the first X ray[1] and is accompanied by much soft tissue swelling. The appearance now strongly suggests an osteogenic sarcoma.

About six weeks after the termination of treatment, on October 18, 1939, the following report was made from the Adelaide Children's Hospital:

> There is evidence of further bone formation, and although the soft tissue tumour appears to be smaller, the bony element is much more evident and almost certainly indicates an osteogenic sarcoma which is still active.

The first report from the Royal Adelaide Hospital was also made on October 18, 1939:

> There is a dense shadow in the region indicated with a small rarefied area at its posterior part. The sclerosed area is fairly sharply defined, suggesting that it is not aggressively malignant at present.

On April 16, 1940, another report from the Adelaide Children's Hospital was as follows:

> Skull. There is a marked reducing of the tumour with a layer of new bone still visible in the right temporal region.

A further report from the same hospital on May 26, 1941, was as follows:

> There is still some bony thickening external and posterior to the right orbit. The bone has a definite margin, but must still be regarded as the remnants of the tumour.

Reports in 1942, 1943 and February, 1944 (from the Royal Adelaide Hospital), all state: "No bony abnormality detected."

At no time was evidence of secondary deposits detected in the lungs.

Discussion.

A decision as to the nature of the tumour remains a little difficult. One cannot arbitrarily thrust aside the opinions of competent pathologists; yet there are a number of points to be made for the diagnosis of osteogenic sarcoma on the one hand and for fibrosarcoma on the other. Let us take the latter first.

In favour of fibrosarcoma are chiefly the opinions of the pathologists in interpreting the results of examination of sections, the successful outcome and the absence of metastases.

In favour of osteogenic sarcoma are the radiological appearances, showing the production of dense new bone with radiating spicules, and, until some months after treatment, an irregular margin, the presence of bone in the microscopic section (personal communication from Dr. Thiersch) and the rapidity of growth. Within six weeks of its first appearance, the tumour had reached a diameter of four centimetres.

[1] Three weeks earlier.

According to Geschickter,[1] fibrosarcomata of bone usually cause the bone to melt away and produce rarefied areas. "In the less typical cases strands of the periosteum which are split and raised may show varying degrees of ossification, but these areas are never dense or conspicuous." Both Geschickter[2] and Kolodny[5] state that fibrosarcomata are distinguished from osteogenic sarcomata by the fact that they do not produce cartilage or bone.

In the case recorded the presence of dense bone visible radiologically, the presence of bone in the sections and the extremely rapid growth of the tumour, lend strong support to the diagnosis of osteogenic sarcoma.

Other possible tumours to be considered are neurogenic sarcoma involving bone, Ewing's tumour and ossifying fibroma. The first can probably be grouped with fibrosarcoma for the purpose of diagnosis, and what has been written about the one will apply largely to the other also. Ewing's tumour can, I imagine, be excluded by the appearance of the histological specimen, while ossifying fibroma, according to Geschickter,[3] is of slow growth and does not respond to irradiation.

Should the diagnosis of osteogenic sarcoma be conceded, the record becomes remarkable both on account of the age of the patient—the youngest Ewing[6] mentions being a girl of ten months—and on account of the so far favourable result. Even if the lesion is classed as a fibrosarcoma, the result is still astonishing when one considers that the only therapeutic measure was the application of a radium mould. Geschickter[4] records one case in an infant, in which a fibrosarcoma of the humerus was present at birth. Amputation was performed at the age of six months, and the child was well almost ten years later. The only fibrosarcoma of the skull to which he refers was in a woman, aged thirty-four years, who died of the condition five years later.

Whatever the final decision may be as to the exact type of tumour, I think there can be little doubt that it must be included under the general term "sarcoma". Why it should have been so amazingly radiosensitive and so free from metastases is beyond me to explain.

Acknowledgements.

My thanks are due to Dr. F. S. Hone, director of the radium clinic, and to the honorary staff of the Adelaide Children's Hospital for permission to publish this case, and also to other members of both staffs who have cooperated in furnishing reports and photographs.

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(1) C. F. Geschickter and M. M. Copeland: "Tumours of Bone", Revised Edition, 1936, page 571.
(2) *Ibidem*, page 586.
(3) *Ibidem*, page 714.
(4) *Ibidem*, page 566.
(5) A. Kolodny: "Bone Sarcoma: The Primary Malignant Tumours of Bone and the Giant Cell Tumour", *Surgery, Gynecology and Obstetrics*, Volume XLIV, Number 4A, 1927, page 169.
(6) J. Ewing: "Neoplastic Diseases", Third Edition, 1931, page 289.

Reviews.

THE GALL-BLADDER AND THE BILIARY PASSAGES.

IN a recent publication[1] Weiss has surveyed the many surgical and medical problems connected with the gall-bladder and bile duct. In view of the magnitude of the subject, the volume is very compact, is of a convenient size to handle and is written in a style at once comprehensible and careful of detail. It is essentially a book for graduates who desire to keep abreast of recent ideas in the management of gall-bladder disease. The chapters are arranged as a series of clinical lectures.

While anatomical details are given clearly, several points have been omitted which are important in actual practice, if relatively minor in theory. The blood supply of the gall-bladder and the abnormalities of the cystic artery are described inadequately. Here, as in several other places, much is left to a diagram or illustration with no key or explanation. No mention is made of the cystic lymph gland, an unfortunately obvious structure on occasion. In the description of the histological structure of the gall-bladder wall reference to Rokitansky-Aschoff sinuses is omitted, although elsewhere there is a photomicrograph showing them. An understanding of these structures in the gall-bladder wall is of primary importance in the pathology of this organ. For the most part the histology is poorly described, but in this regard it must be remembered that the book is primarily clinical. A structure called the "hepatic nerve" is mentioned, composed presumably of fibres contained in the phrenic nerve. It is doubtful whether any anatomist has been able to isolate such an entity.

The physiology of the structure concerned in gall-bladder disease is given briefly but adequately. In the section on history taking undue emphasis is given to the question of pain. While this is of paramount importance to the patient, it may not be the most helpful diagnostic symptom. A very detailed description is given of methods of examination. The lecture on diagnosis is very good.

There is an adequate chapter on the radiology of the gall-bladder by E. Smith and an excellent description of duodenal drainage for diagnostic and therapeutic purposes by Elburhard. This is detailed and practical and would be of great assistance to those who are called upon to treat many patients with gall-bladder disease.

There are two interesting points in the lecture on infectious catarrhal cholecystitis ("infectious" is hardly correct). One is that trauma may initiate inflammation of the gall-bladder. Few will support this opinion, except by the possible traumatic action of bile itself. Secondly, the term "cholesterosis" is used, though the writer does not believe in the absorption or secretion of cholesterol by the gall-bladder mucosa, despite the histological evidence supplied by Boyd and others. A chapter on the pathology of gall-bladder disease based on general principles would have led naturally to a consideration of various types of inflammatory lesions as different phases of the same processes rather than as separate clinical entities requiring individual consideration. Further, it is considered that acute or subacute inflammation precedes chronic cholecystitis; there are many reasons why the converse is true.

One of the most interesting sections deals with treatment. There is an amazing wealth of detail set out in orderly fashion. There is almost too much detail and too careful a consideration of various therapeutic measures which can have but little real effect on the course of the disease. The diets suggested are well selected and are sound in theory as well as attainable in practice. These are given in detail in the section dealing with gall-stones.

Not only is morphine said to be ineffective for biliary colic, but because of its adverse effect on the neuromuscular mechanism of the bile ducts, it is believed to be actually harmful. Such an emphatic opinion is not shared by the majority of surgeons. In the place of morphine a great variety of drugs is suggested down to a suppository of 0·00405 gramme of "Dilaudid". The vast number of new drugs is almost bewildering, yet one cannot overlook the wisdom of the methods used to maintain fluid and salt equilibrium. Although it is admitted that there is no evidence that any measures can influence the passage of stones from the gall-bladder into the duodenum, the way to administer oil for this purpose is described. Emphasis is laid on the need to increase the flow of bile by the administration of bile salts (under various proprietary names), sodium salicylate and preparations of conjugated bile acids. With these substances histamine is recommended for its beneficial action on the common bile duct, even to the expulsion into the duodenum of a calculus.

While the impression is gained that this book is written by one with great experience in the medical management of cholecystitis and gall-stones, a sound opinion is given as to the place of surgery. Medicines cannot cure established cholecystitis or banish stones. With due regard to operative risk, the optimum time and the careful preparation of the patient, removal of the diseased organ gives the most satisfactory results, provided that the diagnosis has been accurate. In acute inflammation of the gall-bladder, a persistent mass, increased muscle guarding, a rising temperature, pulse rate and leucocyte count are indications for operative interference.

There will be general agreement with the opinion that the best results of operative treatment are achieved in those cases in which the diagnosis is clear cut; most, however, would not credit the existence of pseudo-cholecystitis as a clinical entity. Neuromuscular disturbances of the biliary tract in the absence of inflammation or stone may exist in theory; there is little evidence that they exist in practice.

[1] "Clinical Lectures on the Gallbladder and Bile Ducts", by Samuel Weiss, M.D., F.A.C.P.; 1944. Chicago: The Year Book Publishers, Incorporated. 9" × 6", with illustrations. Price: $5.50.

Despite these occasional diversions into the realm of theory, the book is a practical one with sound logical views. The general lines of treatment do not depart radically from the orthodox. In brief, many chronic inflammatory lesions of the biliary tract can be relieved by duodenal drainage and appropriate diet, so that operation is unnecessary or can be postponed to a more favourable time; acute inflammations should be treated conservatively until complications threaten and gall-stones require operative interference.

The association between arthritic conditions and gall-bladder infections is pointed out, and more important still, the harmful association of lesions of the biliary tract and vascular diseases of the heart is emphasized.

The rest of the volume deals with the theoretical and practical aspects of neoplasms of the gall-bladder and bile ducts, jaundice, liver function tests and hypoprothrombinæmia. The surgeon is encouraged to operate in cases of malignant disease if only for palliative reasons. The lecture on jaundice contains some formidable lists and summaries of causative factors. It is interesting to read that an experienced clinician can usually derive from his examination and consideration of the patient all the information which can be supplied by liver function tests. A very good summary of how the various tests are carried out is given.

One cannot help deprecating the growing flood of new, fearsome terms such as angiocholitis, pericholangitic cirrhosis and biliary dyskinesia.

WAR WOUNDS AND INJURIES.

THE second edition of "War Wounds and Injuries"[1] has been considerably enlarged and has now had incorporated sections upon burns and sepsis as suggested by Lord Horder in his foreword to the first edition.

The first three chapters—on resuscitation, on treatment of flesh wounds and on burns—call for little special comment, except that the arrangement of the first chapter is somewhat confused. Following these is a chapter of some eighty pages upon peripheral nerve injuries by Bremner Highet. This is of outstanding interest and importance, embodying as it does a great deal of the most recent work both clinical and experimental, including that of the Oxford Peripheral Nerve Injury Centre. Attention is directed to the retrograde degeneration of nerves, particularly following traction injuries, as affording an explanation of poor results after surgical treatment in some such cases. The nature of the widespread consecutive lesions of muscles, joints and bones is described and their importance is stressed. A good account of "trick movements" is given and of the use of nerve blocking in discriminating between these and instances of anomalous innervation. The technique of operative treatment is very fully described, including the use of grafts and plasma fixation. The danger of post-operative stretching, not only to the suture line but to the nerve trunk itself, is confirmed.

A very good though necessarily rather general account of skull and brain injuries is given by Harvey Jackson. In the opinion of the author the advisability of primary scalp closure has been over-emphasized. He deprecates the local use of sulphonamides, but approves of the use of concentrated plasma for cerebral dehydration.

Geoffrey Knight writes upon injuries of the spine and spinal cord. He suggests that the arterial supply to the spinal cord may furnish to some extent an anatomical basis for spinal interruption. In discussing the contentious subject of treatment of the bladder, he claims that manual expression is attended with a greater risk of rupture than attends unrelieved over-distension and overflow.

War wounds and injuries of the chest are dealt with in eminently sane and authoritative fashion by Tudor Edwards. He discusses the merits of early and late operation and the scope of the procedures to be employed. Measures to ensure safety during pleural irrigation are described. This valuable contribution concludes with a note upon respiratory exercises.

Gordon-Taylor writes graphically and succinctly upon abdominal injuries, with which his name is inseparably linked. If criticism is possible it will be that the principle of exteriorization, as opposed to suture or resection in wounds of the large bowel, might have been given greater prominence. Gordon-Taylor draws attention to the frequency of acute dilatation of the stomach in these and other war injuries. The author's wide experience lends weight to his views upon the great importance of a wisely planned incision of access.

Similarly, the importance of a suitable approach is emphasized by Everidge in the case of renal wounds, combined as they frequently are with intraperitoneal lesions.

The treatment of facial injuries, including burns, is excellently handled by McIndoe, Fry and Shepherd. The methods of dealing with both bony and soft tissue injury are very well described. A short chapter on amputations by Barling is essentially practical.

The section devoted to wounds of the joints is contributed by Gray. While it is not unlikely that the sulphonamides may be found to play a part in treatment in such cases, it would seem, nevertheless, that more space might be given to the treatment of the wounded knee joint with all its difficulties and risks.

Chapter 16, which deals with compound fractures and the problems related thereto, is excellently put together, although necessarily condensed. Mention must be made of an extremely useful chapter upon the sulphonamides and the chemotherapy of various infective conditions.

Tetanus, gas gangrene, immersion foot and hand, gas casualties and anæsthesia in warfare are dealt with in the final chapters. Hewer, who contributes that upon anæsthesia, still favours spinal block in amputations and disarticulation at the hip, provided that the patient's blood pressure is not too low, a condition unlikely of fulfilment. An alternative procedure mentioned by him, the "transverse section analgesia" method, will be preferred by all surgeons of experience.

The second edition of this book can be recommended as a thoroughly worthwhile counsellor and guide for those engaged in traumatic surgery, military or civilian.

[1] "War Wounds and Injuries", edited by R. Maingot, E. G. Slesinger and E. Fletcher; Second Edition; 1943. London: Edward Arnold and Company. 8½" × 5½", pp. 499, with many illustrations.

THE PLASTIC AND MAXILLO-FACIAL ASPECT OF TRAUMATIC SURGERY.

"THE SURGERY OF REPAIR: INJURIES AND BURNS", by Squadron Leader D. N. Matthews, is a well-presented book on the plastic and maxillo-facial aspect of traumatic surgery.[1] Its value is enhanced by being based largely on clinical experience in treatment of Royal Air Force personnel during this war.

The subject is set out in a summary of the present-day general management and operative treatment of wounds and burns. A section on pre-operative preparation contains the modern ideas on the management of shock and a reference to crush injury and traumatic asphyxia.

The essentials in the immediate operative treatment of wounds are noted, with amplification of a few conditions picked out for special description, for example, particle tattoo marks, the technique of wound suture and stitch removal, treatment of skin loss. There is a special chapter dealing in a simple and practical way with the immediate treatment of facial fractures.

The main section is devoted to the technique of subsequent repair. Skin grafting is dealt with fully but concisely in a well-described chapter outlining its scope and operative technique.

In dealing with facial injuries and plastic repair work the author has confined himself to methods and technique which in his experience have been the most satisfactory; he thus eliminates alternative procedures and increases the value of the book as a useful guide.

In conclusion, there is a section on burns containing a description of the present methods of treatment of burns with suggested indications for each, and technique of application.

The book is well illustrated and readable and has attached a series of references in support and amplification. It should particularly appeal to surgeons who have to deal with the immediate or later aspect of casualty work whether in civilian practice or in the services.

[1] "The Surgery of Repair: Injuries and Burns", by Squadron Leader D. N. Matthews, R.A.F.V.R., M.A., M.D., M.Ch. (Cantab), F.R.C.S. (England); 1943. London: Macmillan and Company, Limited. 8" × 5½", pp. 398, with many illustrations, some in colour. Price: 45s. net.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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ONLY THE BEST IS GOOD ENOUGH.

THERE are in Australia few men of military age whose lives have been unaffected by the war. Self-centred and self-seeking individuals who have managed by one means and another to evade all wartime responsibilities must be relatively few in number. Large numbers of those who on medical grounds were classed as unfit for active service have given of their time and energies for the national effort in other ways and other spheres. Then there is a large group of persons whose places in the civilian set-up cannot be filled by anyone else. It is sometimes stated that the number of men regarded as indispensable to civilian industry and to civilian life in general is larger than it should be. This may or may not be true, but even if there is some truth in the statement, there can be no denying the fact that the people of the Commonwealth have been "manpowered" to a very considerable extent. Of course, some of those who are indispensable to the civilian life of the community have wished to serve with the fighting forces and remain at their posts only because they have been directed to do so. These persons are affected by the war—in a few instances the effect may be considerable—and everyone will agree that they and others in the civilian set-up are giving important service to the country. There is another group of persons who are engaged in wartime industry. Some of them have had to leave their homes and to put up with inconvenience and even hardship in other places. These persons, men and women, are doing most valuable work in the national sphere. But over and above all these are the members of the services, and of service members *facile principes* are all who have served and are serving overseas and in the islands to the north of Australia. When we talk about persons affected by the war we need to adjust our ideas when we discuss members of the fighting forces in operational areas. These men (and we do not forget the women who have served in forward areas) have left behind them all that man holds dear and with superb and audacious courage have faced a malignant and inhuman enemy. Many have lost their lives, some have fallen into the hands of the enemy, and others have received wounds some of which are inseparable from permanent invalidism or deformity. To say that these men have deserved well of the nation is to make an inadequate statement. When once the war is over and members of the fighting forces try to take their places as members of the civil community the motto of the nation should be that only the best is good enough for them. Everyone at the present stage of affairs will agree and say: "Of course, we would not for a moment think of anything else." At the present stage of affairs—yes. But human memory is short—the last war proved it, and in spite of acts of Parliament which decreed preference to soldiers and in spite of good intentions before peace was declared, many soldiers, good men and true, had a most difficult time, and by no means a few of them were denied the encouragement and help which with every right they expected to receive from the general run of people. When we declare that only the best will be good enough for men of the services returning to civil life, we do not mean, and they will not expect, that a life of ease and comfort with spoon-feeding and no responsibility shall be provided. They will look for an opportunity to compete among the active and self-supporting members of the community, for a chance to show that zest and audacity can win a place in peace as they won many an objective in war. Now is the time to think, to write, to talk about these things and to make plans so that after this war there shall be no forgetting, no evasion.

The medical profession of Australia has a special responsibility towards those of its members who are on service. And not only to these, but also to those who had already been enrolled as students of medicine when war service claimed them. Equally with these students may be classed the young men who had signified their intention of studying medicine, but who were content to postpone their medical studies for the more strenuous and more hazardous role of combatant in the forces. The responsibility of the medical profession in this matter is not only a question of sentiment, based on a brotherhood with a community of interests. It is not only a question of common sense from the point of view that members of a profession are more likely than any outsiders to understand and to be able to satisfy the needs of other members of the same profession. There is another fact which must not be allowed to fade from memory. It was expressed admirably in *The Lancet* of February 5, 1944, by a correspondent signing himself "Spero Meliora" who in regard to another correspondent wrote: "Let him remember that he has already received more protection than he is likely to provide in a lifetime of medical work." These words may be taken to heart and pondered by civilian medical practitioners when they think of their professional brethren serving with the fighting forces.

There are two matters which the medical profession must keep in the forefront of its present activities. In regard to one of them the time will probably come when individual action will be called for; the other is a subject in which action through organized bodies and by general discussion is more likely to be effective. The first of these matters is the placement of medical officers of the forces

on their demobilization in the ranks of civilian practice. As was recorded in a recent issue of this journal, the Federal Council has after careful inquiry and discussion decided to inform the Central Medical Coordination Committee that it, the Federal Council, desires to play the major part in the placement of medical service personnel in civil practice. This means that individual members of the six Branches of the association will have to open their ranks to welcome new recruits to practice. There is sometimes a curious hesitancy occasionally followed by opposition on the part of a certain type of practitioner to look with favour on a newcomer, even though he himself may be trying to do much more work than he can really accomplish with credit to himself or benefit to the public. There must be none of this foolishness; its exhibition would not only call for censure as unworthy of the individual and as likely to bring reproach on the whole profession, but would have to be followed by action either by the proposed newcomer himself or by another authority that might come into the picture. As far as can be gathered, practitioners throughout Australia will be prepared to extend the hand of welcome to new colleagues from the forces. The remaining matter has to do with the recall to medical schools of men who have served for a certain period in the forces, and who have already completed one or two years of the medical course, or who prior to enlistment in the forces declared their intention to study medicine. This matter has been debated by the Federal Council, and reference was made to the discussion in our recent account of the May meeting of the Council. It was also mentioned at the meeting of the Royal Australasian College of Surgeons in Melbourne last May by the President, Sir Alan Newton, as recorded in this journal in the issue of June 24, 1944. There is no one who will deny that the profession of medicine needs within its ranks persons of the highest integrity, who are gifted not only with sufficient intelligence to enable them to satisfy the examiners of a medical school, but with a sense of duty, with zest, audacity and imagination, as well as with a knowledge of men and affairs. After three or four years of active service, most of those who had started their medical studies or who intended to start them, will have these qualities. To delay their recall to the universities for too long will be to make the resumption of a student's life more difficult. The members of the medical profession who are on active service have been described as the very cream of the profession, as indeed they may well be. In these circumstances those who can be classed as medical students in the forces must be regarded in much the same kind of light. Those who control the release of men from the services and their entry into university faculties must be made to realize this. These authorities will all agree that "only the best is good enough", but effect must be given to such a sentiment—the best must be provided.

Current Comment.

HEPATITIS.

FURTHER communications continue to be made to medical literature on the subject of epidemic hepatitis and the related variety of hepatitis following the administration of human blood serum or plasma. The nature of the epidemic disease and the experimental work on transmission were discussed in these columns early this year. It is now desired to call attention to some further recent work. B. Lucké has surveyed the whole subject, described accurately the clinical aspects of fatal cases studied by him, and given a well-illustrated account of the post-mortem findings, relating these to the disturbances of liver function noted during life.[1] The same author has published an article adding to our knowledge of the liver changes occurring in patients who recover.[2] Further studies on the clinical aspects of cases of jaundice in the United States Army are to be published by other writers. It is assumed by Lucké that all varieties of epidemic jaundice are essentially the same, whether arising spontaneously or after the injection of human serum. This conforms with current beliefs. However, certain problems, such as the longer incubation period and the greater number of severe and fatal cases in post-inoculation jaundice, are not yet solved. This series includes 125 fatal cases, a number which may surprise those who are unfamiliar with the literature. The clinical course of the fatal cases presented the familiar picture seen in acute or subacute hepatic necrosis, whether it follows this epidemic infection or the ingestion of certain hepato-toxic drugs. The pre-icteric stage was not remarkable, and in the intermediate stage following the onset of jaundice no cause for alarm was noted in most cases except a few in which a grave degree of illness was obvious from the beginning. The final and lethal phase of the disease arrived with dramatic suddenness. Lethargy and coma, excitement, delirium, and other disturbances of cerebral function appeared; pernicious vomiting was common, and ascites occurred in 60% of cases. At autopsy the liver was usually small, sometimes of only half the normal weight; this was most frequently noted in cases in which the patients died within five weeks. After this period regeneration of liver cells tended to reinstate the size and weight of the organ. The appearance was the classic irregular shape, with red diffuse areas alternating with others that were lobulated and bile-stained. Microscopically there was the customary disappearance of parenchymal cells even in areas where the ghost-like outlines of the lobules could still be recognized. Lucké comments on the remarkable speed with which all trace of these cells are removed. Hyperplasia of liver cells has always been an interesting phenomenon; its importance in the survivors of destructive hepatic disease will be referred to later. As early as the tenth day new liver cells are budding out into the depleted stroma, and in less than twenty days a large mass of new liver tissue may be formed, though the architecture is distorted. Proliferation of the bile ducts occurs also, and Lucké inclines to the view held by others that parenchymal cells may arise from this source. Inflammatory changes were sometimes observed throughout the whole alimentary tract. Œdema and phlegmon of the mucous and submucous coats were not uncommon and were found only where ascites was also found. Lucké thinks that these changes are terminal, and that such bacterial invasion as was found in the affected bowel was a late secondary manifestation. In the nervous system lesions of slight degree, consistent with a mild type of meningo-encephalitis, were observed.

Lucké discusses the mechanism of the pathological physiology of the disease, particularly with reference to jaundice, ascites, hæmorrhagic phenomena and the cerebral disturbances. Persistent jaundice he considers is due to mechanical obstruction of the intralobular canaliculi, and it is noted with pleasure that he deprecates attempts to explain such disturbances of function by merely attaching the label of any particular "type" of jaundice, whether one follows the school of McNee or Rich.

The ascites he thinks is due to alteration in plasma proteins and increase in portal blood pressure. The nervous changes are more obscure, for the anatomical basis is ill defined. Lucké does not think that any resemblances to the so-called Wernicke's syndrome are sufficiently close to warrant attributing the cerebral disturbances of function to vitamin B_1 deficiency. He thinks, however, that the lowered

[1] *The American Journal of Pathology*, May, 1944.
[2] *Ibidem.*

detoxicating powers of the liver may permit poisonous by-products to circulate and thus affect the sensitive nervous system. The subject of Lucké's other article, the description of the changes found in the livers of patients who had recovered from the disease, is of even greater interest. The material was obtained in two cases during laparotomy for other cause, and in twelve cases post-mortem material was studied in men who had died from accident or other illnesses from one to fourteen months after clinical recovery from hepatitis. This work is supplementary to that of Dible, McMichael and Sherlock, and of Roholm and Iversen, who, in accordance with a standard technique, aspirated material from the livers of patients during and after attacks of hepatitis and made histological studies of it. Luckés findings support the results of this work and indicate that in acute hepatitis the liver tends to heal without permanent damage. Clinicians and epidemiologists are emphatic that the liver recovers completely in most cases, and that cirrhosis does not occur as a significant late sequel of the disease. Lucké's work supports this belief. In all his cases the liver appeared normal, and though in some cases the repair or replacement of damaged liver cells was not complete, this was only found where intercurrent accident had terminated the patient's life before complete healing was achieved. The later cases proved that complete restoration occurred, and though traces of damage were found in the portal tracts, no significant scarring remained. We now know positively, therefore, that in acute hepatitis, in which are included the ordinary spontaneous infective disease and also those forms of hepatitis occurring after the injection of homologous serum, damage of liver cells occurs. We also know that this damage is associated with a dislocation of the liver architecture, and that the more persistent forms of jaundice are associated with obstruction of the bile canaliculi in the lobules. But, although severe and progressive destruction may occur, and may anticipate or outrace the characteristically valiant regenerative powers of the liver cells and cause death, the outcome is in the majority of cases a happy one, for complete recovery usually takes place.

DEATH FOLLOWING STERNAL PUNCTURE.

THE history of biopsy of the bone marrow goes back to 1908, when Ghedini introduced the procedure of examining tibial bone marrow as an aid to the diagnosis of leishmaniasis and malaria. Seyfarth, in 1923, recommended the use of a small trephine for obtaining biopsy material from the sternum for the study of blood dyscrasias. In 1927 Arinkin suggested the method of aspiration of the sternal marrow with a spinal needle. Since then, a great many articles and several books have been written on this subject. A review of this literature reveals no history of complication or death, either of man or of animals. Leo M. Meyer and Jacob Halpern, however, have recently recorded the history of a patient who died a few minutes after a sternal puncture.[1] The patient had been under medical care for some time for chronic myeloid leuchæmia. He had had radiation therapy. After numerous relapses and remissions he had been referred to the King's County Hospital for blood transfusion and further therapy. He appeared anæmic and chronically ill. The liver and spleen were very much enlarged. The heart was not increased in size; no murmurs were heard and the blood pressure was not raised. An electrocardiogram was interpreted as indicating an old posterior wall infarct. The patient was prepared for sternal puncture in the usual way. "Novocain" solution (1%) was infiltrated into the skin and subcutaneous tissue down to the periosteum of the sternum in the mid-line at the level of the third intercostal space. The patient was extremely apprehensive because of two previously unsuccessful attempts to aspirate his marrow at the Post-Graduate Hospital. No marrow could be obtained; the needle was therefore removed from the bone and inserted at a slightly different level. Several drops of marrow were withdrawn and subsequent smears proved them to be typical of chronic myelogenous leukæmia. The patient did not complain of any unusual pain at the time of the puncture; but immediately after the removal of the needle he became faint, dyspnœic and cyanotic; death occurred within a few minutes. Stimulants and artificial respiration were of no avail.

Unfortunately, permission for autopsy could not be obtained. Having a badly damaged heart, anæmia and chronic leuchæmia of three years' duration, the patient suffered an adequate combination of disease processes to cause death at any time. Meyer and Halpern, however, are inclined to believe that the *modus operandi* was one of fatal cardiac inhibitory reflex through the vagus, initiated by fear, as suggested by Weiss in a case report published in 1940. They recommend the use of a mild sedative before sternal puncture when the patient is frightened, and particularly when the heart may have been damaged previously.

[1] *American Journal of Clinical Pathology*, April, 1944.

INJURIES TO THE KNEE JOINT.

IT is not intended that any arguments should be raised concerning the results of surgical procedures designed to relieve disabilities following injuries to the internal structures of the knee joint. During the last war discussion arose on the results of operations on the menisci and statistical and critical contributions have been made to medical literature on the subject since the beginning of the present war. But in this instance it is desired only to draw attention to a study of 109 consecutive cases of injury to the knee joint by J. S. Batchelor.[1] In this review of soldiers treated at an orthopædic centre evidence of damage to the important ligaments and to the menisci was found in 90 cases out of 119. Of these, 34 injuries involved the medial meniscus, 14 involved the lateral meniscus, 37 the cruciate ligament and five the collateral ligament. Batchelor is particularly concerned in his article with tears of the cruciate ligaments; he claims that damage to these structures is frequently overlooked and emphasizes the fact that his series, which was made up entirely of patients who presented symptoms of internal derangement of the knee, revealed cruciate ligament damage in one-third of the total. It is not expected that all practitioners who see patients complaining of symptoms following some injury, either trifling or severe, to the knee joint, should have the full knowledge of orthopædic surgeons; but Batchelor lays stress on the outstanding complaint of the patient with cruciate injury, namely, weakness. It naturally follows that recurring attacks of synovitis may take place, and it is a truism to point out that synovitis is in itself not a diagnosis. If care is taken to test the integrity of the cruciate ligaments by an attempt to move the tibia on the femur in an antero-posterior direction with the knee partly flexed and the muscles completely relaxed, these injuries should not be overlooked. Batchelor strongly advises examination of the knee under general anæsthesia, for example, under a small dose of "Pentothal", which provides just enough relaxation to make examination easy. In this way the cruciate ligaments may be tested, and by rotation with the tibia on the femur with the knee in all positions it may also be possible in many cases to reveal damage to a cartilage. Treatment will depend upon the degree of damage and the length of time since it took place, but it is likely that in all cases, except some of the lesser degrees of sprain, immobilization for a variable period will be required. Omitting the further technical details in this paper, we may note the author's contention that there is a very good reason for not focusing too much attention on meniscal damage alone, and that all injuries affecting the knee joint warrant an examination which is conducted with a thoughtful consideration of the anatomy and functions of the structures involved.

[1] *Guy's Hospital Reports*, Volume XCII, 1943.

Abstracts from Medical Literature.

PHYSIOLOGY.

Age and Resistance to Anoxia.

H. G. GLASS, F. SNYDEN AND E. WEBSTER (*The American Journal of Physiology*, February, 1944) discuss the rate of decline in resistance to anoxia of rabbits, dogs and guinea-pigs from the onset of viability to adult life. The duration of respiratory movements when nitrogen was breathed instead of air was determined by the aid of individual kymograph records of respiration in 174 rabbits, 28 dogs and 50 guinea-pigs at various stages of development from the onset of viability to maturity. Analyses of arterial blood samples showed rapid development of extreme anoxæmia throughout these experiments. When animals were placed in nitrogen immediately after birth at term, breathing continued in rabbits for thirty-one minutes, in dogs for thirty-one minutes and in guinea-pigs for six minutes. In rabbits delivered operatively at the onset of viability (twenty-nine days), breathing persisted for forty-four minutes, and in rabbits retained within the uterus for three days past term (thirty-five days), breathing continued for seventeen minutes; the last-mentioned figure corresponded to the time of survival of rabbits suckled for three days after birth at term. Thus, tolerance to anoxia is related to the stage of development rather than to the environment. Furthermore, guinea-pigs at birth were much less tolerant of anoxia than dogs. In the suckling period, the survival time of rabbits at one week was ten minutes; at two weeks, four minutes; and at three weeks, one and a half minutes (this is the same as that of the maternal animal). Changes in tolerance to anoxia by the dog during the suckling period parallel closely those of the rabbit. The defence of the fœtus against asphyxia is of significance, in face of the increased hazard of respiratory failure during the terminal phase of intrauterine life and the early neonatal period.

The Effect of Repeated Determinations on the Basal Metabolic Rate of Children.

R. C. LEWIS, A. M. DUVAL AND A. ILIFF (*The American Journal of Physiology*, January, 1944) refer to a previous report on the basal metabolic rate of children, in which 1,007 determinations were made on 70 healthy boys and 718 determinations on 57 healthy girls. Because the suggestion has appeared in the literature that standards for basal metabolic rate based upon repeated determinations on the same subjects are lower than those computed solely from the first satisfactory determinations, the effect of repeated testing on the level of the basal metabolism has been considered. Comparison of the results of the first satisfactory determination of basal metabolic rate with those of the second, third and fourth satisfactory determinations on children who varied in age from two to ten years reveals no significant difference which can be attributed to experience. Of 94 subjects, 35% gave satisfactory results on the first determination, and 55% and 80%, respectively, had given satisfactory results by the second and third determinations. Analysis of the results of the first determinations on those children who gave satisfactory results on the first day that observations were attempted reveals no significant difference from the results of the second, third and fourth actual determinations. A preliminary testing period may or may not be necessary to procure satisfactory results in the determination of the basal metabolic rate of children. Accordingly, no practice period is prescribed, but the first determination at which the child refrains from muscular activity and is relaxed but awake is accepted as satisfactory. Experience by the subject tends as a rule to increase the ease with which a satisfactory determination may be obtained. The prediction standards for the basal metabolic rate of children, aged from two to fifteen years, inclusive, that have been established by the longitudinal study of the Child Research Council, may be used to evaluate the results of any satisfactory determination on a child, regardless of his familiarity with the procedure.

Changes in the Vital Capacity when the Body is Immersed in Water.

W. F. HAMILTON AND J. P. MAYO (*The American Journal of Physiology*, March, 1944) state that the vital capacity is less when the subject is supine than when he is standing, but that the fitting of four blood-pressure cuffs inflated to 70 millimetres' pressure before the supine position was assumed caused the vital capacity when the subject was recumbent to approach the "standing" value. This led to the conclusion that circulatory factors play an important role in the postural reduction of vital capacity, and suggested the determination of vital capacity when the body was immersed in water. The vital capacity is about 300 cubic centimetres less when the body is immersed in water to the nipple line than it is when the subject is standing in air. When diastolic pressure cuffs are put around the bases of the arms and legs of the subject in water, the vital capacity is about 175 cubic centimetres higher than without the cuffs. Indications are that the venous return is increased by immersion sufficiently to increase the load of blood in the lungs and decrease the space available for air. When the subject lies supine in water, his vital capacity is no greater than when he stands upright in water. If he is allowed to settle as he forces the air out of his lungs, completing the expiration at a depth of two or three feet, the added pressure on the thorax enables him to expel a larger than normal "vital capacity". These experiments were performed with a nose clip firmly in place and a mouthpiece connected to the spirometer by a long tube. When the subject had settled under the water, with the understanding that he was to inhale as soon as he had exhaled completely, he found that it was nearly impossible to make the effort. This was not because he was so deeply under water that he could not accomplish the muscular act of expanding the chest, but was due to stimulation by the water on the face or some similar factor that prevented his even trying to inhale. The situation seems to be analogous to the more highly developed protective reflexes in diving animals, which inhibit breathing when water covers the face and even result in asphyxia if a drop or two enters the nostril. The force of the inhibition in man is not strong, because it may be broken through by a firm effort of the will. Breathing through a tube, with the face under water, does not seem natural, but can be accomplished without very great effort after a few minutes' practice.

Arterial, Cerebro-Spinal and Venous Pressures in Man during Cough and Strain.

W. F. HAMILTON, R. A. WOODBURY AND H. T. HARPER (*The American Journal of Physiology*, March, 1944) discuss the recording of various pressures in man made during coughing and straining. Differential pressure records are shown which separate the changes in arterial pressure which are due to simple propagation of intrathoracic pressure from those which are due to changes in blood flow. It is shown that increases due to propagation of intrathoracic pressure strain only the peripheral arteries, whereas increases due to changes in blood flow or to changes in peripheral resistance strain also the vital arteries to the brain, spinal cord and viscera. The nature of the cerebro-spinal pressure pulsations is discussed. During the preliminary pressure rise of the cough, people whose circulation is hypodynamic have arterial pressures which are no higher than intrathoracic pressures at the same time. During brief intervals there is therefore no effective head of pressure to irrigate the coronary or other vital vascular beds. During the expulsive phase of the cough the arterial pressure may continue to rise while the intrathoracic pressure is going down, or the arterial pressure may descend more slowly than the intrathoracic pressure. This signifies that the pressure distending the aorta is rising, and since it often occurs during diastole, it implies that during the expulsive phase of a cough blood is forced from the lungs through the relaxed left side of the heart and into the aorta. The cough may force blood into the aorta in patients with hypodynamic circulation and in patients with congestive heart failure. This may occur in normal subjects, but no evidence has been obtained to support the idea that it does.

The Use of a Gas Mask for the Relief of Occluded Eustachian Tubes and Sinuses.

O. S. GIBBS (*The Journal of Aviation Medicine*, February, 1944) discusses measures for the relief of occlusion in the upper air passages, and describes a simple and effective method of obtaining controllable pressure changes, which depends upon the use of a gas mask. Changes of the order of two pounds per square inch, positive or negative, can be obtained—namely,

total change of four pounds per square inch, equivalent to about an 8,000 foot change in altitude from sea level. The use of the method is particularly directed toward the equalization of pressures in occluded sinuses and Eustachian tubes. The use of a pocket-type inhaler helps materially and does not decrease the practicability of the procedure.

BIOLOGICAL CHEMISTRY.

"Atebrin."

J. V. SCUDI AND V. JELINEK (*The Journal of Biological Chemistry*, January, 1944) have investigated the urinary excretion products of "Atebrin". The study was limited to those substances extracted from alkaline solution with isoamyl alcohol, and indicates that the urinary excretion of "Atebrin" is quite complex. At least four acridine derivatives appear in the urine of the dog; of these, one has been identified as unchanged "Atebrin". The remaining three have been characterized spectrophotometrically. Various properties have been noted and limited conclusions regarding their functional groups have been drawn. There is also a urinary fraction not normally excreted by the dog which does not appear to be composed of acridines. Comparison of the acridines eliminated by the rat, rabbit, dog and man indicates that the urinary excretion of "Atebrin" varies in different animal species.

Vitamin M.

J. R. TOTTER *et alii* (*The Journal of Biological Chemistry*, January, 1944) have investigated the relation between vitamin *M*, xanthopterin and folic acid. In a number of materials tested, the distribution of the factor stimulating growth of *Streptococcus lactis R* (folic acid) was shown to be different from that of vitamin *M*. Pantothenic acid, choline, *p*-amino-benzoic acid, pyridoxine and inositol did not prevent nutritional cytopenia in the monkey. The treatment of cytopenic monkeys with synthetic xanthopterin was followed by reticulocyte responses and increases in the number of red and white blood cells. The results suggest that xanthopterin or some closely allied substance may be required by the monkey for normal hæmocytopoiesis; however, it seems probable that unidentified substances may also be necessary.

Tumours.

J. M. TWORT AND R. LYTH (*The Journal of Hygiene*, January, 1944) have investigated the prophylactic effect of a colloid material on the skin of mice painted with various types of carcinogenic agents. The colloid material contained as active constituents 30% tetrachlorethylenum and 10% *oleum pini*. It had been stated that this material had been of considerable value in certain forms of dermatitis, including that produced by mineral oil. This colloid material delayed the advent of tumours when used in conjunction with benzpyrene, gas tar or shale oil. Its protective action exceeded that of lanolin when used alternatively with either benzpyrene or gas tar, but it afforded less protection than lanolin when used in conjunction with shale oil. The incorporation of some 25% of lanolin in the colloid rendered it less effective than the original, except possibly when it was used in conjunction with shale oil. Skin rendered hyperplastic by the applications of benzpyrene gave a higher yield of tumours when subsequently treated with the colloid material than when left untreated.

Hæmoglobin.

R. J. BING (*The Bulletin of the Johns Hopkins Hospital*, March, 1944) has studied the effect of hæmoglobin and related pigments on the renal functions of the normal and the acidotic dog. The intravenous injection of crystalline methæmoglobin into dogs rendered acidotic with ammonium chloride is followed by a fall in the effective renal plasma flow, the glomerular filtration rate, and the tubular reabsorptive capacity for glucose. The renal lesion in acidotic dogs given methæmoglobin intravenously consists of hydropic degeneration of the proximal convoluted tubules, the occurrence of cellular necroses in the distal segment and plugging of the collecting tubules with hyaline and in some instances with pigmented casts. Dilatation of the collecting tubules and glomerular damage are absent. The intravenous injection of myoglobin and of hæmoglobin into acidotic animals, and of methæmoglobin and hæmoglobin into normal animals, fails to produce renal failure. The intravenous injection of lactic acid and of hydrochloric acid produces a rapid fall in clearances caused by the urinary excretion of methæmoglobin. Acidosis produced by oral administration of ammonium chloride has no effect on the renal function. The mechanism of the methæmoglobin anuria and its relation to the ætiology of renal failure following blackwater fever, crush injuries and hæmoglobin transfusions, are discussed.

Thiamin.

A. F. RASMUSSEN *et alii* (*The Journal of Infectious Diseases*, January, 1944) have investigated the influence of the level of thiamin on the susceptibility of mice to poliomyelitis virus. Mice fed on diets deficient in thiamin show a lower incidence of infection to Theiler's virus and to Lansing strain poliomyelitis virus than do animals fed on a similar diet with the optimum amount of thiamin. In some instances, these thiamin-deficient survivors, when subsequently given adequate thiamin, become paralysed after a prolonged incubation period. The decrease in susceptibility noted in mice receiving diets restricted in caloric value, but adequate in all vitamins, is similar to that observed in thiamin-deficient animals, but is less pronounced.

A. R. MAASS *et alii* (*Archives of Biochemistry*, April, 1944) have examined the relation of thiamin to blood regeneration. Growing and adult dogs were maintained on a highly purified ration supplemented with crystalline *B* vitamins, exclusive of thiamin. Blood analyses were carried out at various levels of thiamin feeding with and without phlebotomy, and the rate of regeneration was followed. Anæmia was induced in all dogs by phlebotomy. Food consumption is spasmodic in the presence of a thiamin deficiency. An amount less than 10 microgrammes of thiamin per kilogram of body weight per day is inadequate for maintenance of body weight for adult dogs. Growth increases at this level for growing dogs are not quite comparable to the increases obtained by litter mates at higher thiamin levels in the diet. Adult dogs receiving a diet restricted in thiamin and growing dogs whose diet is supplemented with 10 microgrammes of thiamin per kilogram per day, show no indication of anæmia. Inanition, resulting from the thiamin deficiency, when associated with the strain of phlebotomy, results in some limiting of the hæmatopoietic ability of the animal. There is no disturbance of the hæmatopoietic function of either growing or adult dogs under the strain of phlebotomy and anæmia when the thiamin intake is restricted.

Para-Amino-Benzoic Acid.

W. W. SPINK *et alii* (*The Journal of Experimental Medicine*, April, 1944) have investigated the production of *p*-amino-benzoic acid by staphylococci. Strains of staphylococci produce diazotizable materials which can be converted to a dye, and the intensity of the colour reaction can be estimated in the same manner as *p*-amino-benzoic acid. The sulphonamide-resistant strains which were studied produced more diazotizable substance than the non-resistant strains. The development of a colour by the diazotizable substance can be inhibited by exposure of the substance to soil bacillus specifically adapted to oxidize *p*-amino-benzoic acid. The diazotizable substance produced by staphylococci inhibits the anti-staphylococcic action of sodium sulphathiazole to approximately the same degree as equivalent amounts of pure *p*-amino-benzoic acid. Two microbiological methods for assaying *p*-amino-benzoic acid were employed for estimating the amount of this material produced by the staphylococci. In general, the sulphonamide-resistant strains produced more *p*-amino-benzoic acid than the sulphonamide-sensitive strains. The inconstant results obtained with these biological assays are discussed.

Magnesium.

L. J. SOFFER *et alii* (*The Journal of Clinical Investigation*, March, 1944) have investigated the effect of sodium chloride, magnesium sulphate, thyroxine, and thyreotropic hormone on the blood magnesium partition in normal dogs. The administration of magnesium sulphate, sodium iodide and thyroxine produced no appreciable change in the percentage of bound magnesium. Injections of thyreotropic hormone produced an increase in the percentage of bound magnesium, followed by a reduction to levels considerably below the control values. After the injections of the drug were discontinued, the percentage of bound magnesium increased beyond the control levels. The possible significance of these findings in relation to clinical Graves's disease is discussed.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on June 22, 1944, at the Royal North Shore Hospital of Sydney. The meeting took the form of a number of clinical demonstrations by members of the honorary medical staff of the hospital. Parts of this report were published in the issues of July 29 and August 5, 1944.

Tuberculosis of the Knee.

DR. A. R. HAMILTON showed a male patient, aged eight and a half years, who had had a discharge from a sinus in the knee, limitation of movement of the knee and a swelling in the knee. On September 12, 1937, at the age of one year and eight months, he had been admitted to hospital with a discharging sinus on the postero-lateral aspect of the left knee and limitation of movement and swelling of the same joint. The Mantoux test produced a positive reaction, and the Wassermann test failed to produce a reaction. X-ray examination revealed a destructive lesion involving the distal epiphysis and the metaphysis of the left femur; the lesion was considered to be of tuberculous origin. A Thomas bed-knee splint was applied, and rapid improvement took place from the clinical aspect, although radiographically destruction of the bone advanced. On June 22, 1938, the child was transferred to the Margaret Reid Hospital in a walking calliper made in accordance with Thomas's original design, a patten being placed in the opposite shoe, and about six months later he went home. Six months later still the condition retrogressed, and he was readmitted to the Margaret Reid Hospital for a further period of recumbency and calliper treatment. The calliper was worn for several years; in July, 1943, gradual omission of the calliper was commenced, and on January 27, 1944, the calliper was finally dispensed with. Dr. Hamilton said that the knee functioned freely, and the latest X-ray film revealed a satisfactory state of affairs. The point of interest was the degree of function that remained after a tuberculous lesion had extensively involved an epiphysis.

Osteochondritis Dissecans.

Dr. Hamilton's second patient was a male, aged fourteen years, who had suffered from pain and tenderness in the knee joint, and from locking of the joint. He had first begun to complain of "clicking" in his knee in October, 1941, when he was ten and a half years old. At this time his knee used to become painful and the joint used to lock.

On examination, the only abnormality detected was slight tenderness over the left knee joint. An X-ray film taken in August, 1942, revealed early *osteochondritis dissecans* of the left knee. The patient was not admitted to hospital for some time on account of a series of colds and the presence of abnormal signs on examination of the chest.

On March 29, 1943, operation was performed. When the joint space was exposed, the articular cartilage for about one inch over the medial femoral condyle was reddened, but not loose, and no loose body was detected in the joint. The vessels around the femoral margin were dilated. The medial meniscus was removed. After operation the patient was left in a back splint for three months in bed, as he was not allowed to take weight on his leg. Then a non-weight-bearing calliper was fitted, and the patient wore this continually for three months; after this he wore it only in the daytime till January, 1944, when it was omitted completely. At the time of the meeting the patient had full extension, no pain, no effusion, and flexion through 130°; X-ray examination revealed no lesion.

Perthes's Disease.

Dr. Hamilton finally showed a male patient, aged ten years, who had suffered from pain in the groin for three months. In the middle of 1941 the patient, then aged seven years, had attended the hospital complaining of pain in the right groin and down to the back of the knee. The pain was not severe at first, and was absent during rest; but finally the patient could hardly walk for pain. He had no pain elsewhere and no feverishness, but he walked with a limp. He ate well, had not vomited and had had no recent illness.

On examination, no paralysis of the leg was found and the reflexes were normal; no muscular atrophy was present. Abduction spasm of the right hip was present, and there was tenderness over the posterior aspect of the head of the fibula. The temperature was 99° F., the pulse rate was 80 per minute, and at that stage the only diagnosis was that of an "observation hip"—in other words, some inflammatory condition. No heat or swelling was present, but admission to hospital was advised, and an X-ray examination, Mantoux test and blood count were carried out. The X-ray examination revealed advanced Perthes's disease of the left hip. Frame treatment was instituted, and subsequent X-ray films revealed Perthes's disease of the right hip as well as the left. The child remained on a Jones's frame for ten months; at the end of 1942 a walking calliper was applied to each leg. In April, 1943, X-ray examination suggested either old Perthes's disease or a slipped epiphysis, but the lesion showed no evidence of activity. The patient continued to wear callipers for gradually decreasing periods, till they were finally and totally omitted in January, 1944. At the time of the meeting he was not wearing callipers; the condition was healed, and function was excellent; no symptoms were present, and reformation of the femoral epiphyses was satisfactory.

Caliectasis of the Left Kidney, Ectopic Right Kidney and Congenital Atelectasis of the Left Lung.

DR. R. J. SILVERTON showed a male patient, aged seven years, who complained of a tickling sensation in the throat and a tendency to severe colds. Examination revealed congenital atelectasis of the left lung and a swelling in the lower part of the abdomen. No urinary symptoms were present. The urine was sterile, and the blood urea level was twenty milligrammes *per centum*. The left kidney was in the normal position and was affected by primary caliectasis; there was no dilatation of the pelvis and no obstruction to the ureter. The mass in the abdomen was caused by an ectopic right kidney, which was lying in the mid-line low down and also to the left side, and might be fused with the lower pole of the left kidney.

Left-Sided Ureteric Calculi; Right-Sided Renal Staghorn Calculi.

Dr. Silverton next showed a patient, aged twenty years, a member of the Australian Imperial Force. He had suffered from pain in the back, worse on the left side, for eight years, from hæmaturia two or three times in the last four or five years, from frequency of micturition, and from burning and scalding on micturition once a week over the last four or five years. He had a good stream and no difficulty with micturition; he had passed no gravel or stones. The patient had suffered from malaria and dengue fever.

The urine was found to contain pus cells and coliform bacilli. The hæmoglobin value of the blood was 90%, and the leucocytes numbered 11,550 per cubic millimetre. The blood urea level was twenty milligrammes *per centum*. X-ray examination revealed a staghorn calculus on the right side, and a nest of stones in the left ureter at the pelvic brim. Laparotomy revealed a dilated left ureter; stones had passed up into the kidney pelvis.

Pyonephrotic and Aplastic Kidney.

Dr. Silverton's third patient was a female, aged fourteen years, who complained of occasional nocturnal frequency of micturition. An excretion pyelogram revealed a small rudimentary hydronephrotic kidney on the right side, diminished excretion from the left kidney, and ulceration of the lower pole of the calyces consistent with pyelitis. The urine from both ureters was sterile, but a catheter specimen contained numerous coliform bacilli. A cystoscopic examination revealed no abnormality in the bladder, and no ureteric block. Right nephrectomy was performed on April 4; the kidney was small. Examination revealed that the cortex was reduced, the pelvis was distended and the calyces were distended. Microscopic examination revealed pyelonephritis; more fibrosis was present than would have been expected from the inflammatory changes. The appearances were suggestive of an underlying failure of development—aplasia of the kidney.

Hypernephroma of the Right Kidney.

Dr. Silverton finally showed a female patient, aged fifty-five years, who had undergone right nephrectomy at another hospital on June 15, 1944. She had suffered from pain in the right iliac fossa for one month, and for six days only in the right loin. Blood was seen in the urine for three days at the beginning of the attack of pain in the right iliac fossa, but not before or since. Retrograde and excretion pyelograms revealed a large circular shadow continuous with the lower pole of the right kidney and displacing the

pelvis and calyces up and out. A diagnosis of a large solitary cyst of the lower pole was made. At operation the mass was found to be a solid, rounded, parenchymatous neoplasm, and nephrectomy was performed.

Empyema Treated with Penicillin.

DR. BRUCE WHITE showed a female patient, aged twenty-eight years, who had been admitted to hospital on March 28, 1944, with the diagnosis of pulmonary tuberculosis and pneumothorax with empyema in the right pleural cavity. She had been receiving right artificial pneumothorax treatment since February, 1943.

On her admission to hospital she was treated with negative pressure drainage for two days; after this had been suspended, she had frequent aspirations every five or six days followed by an injection of ten cubic centimetres of "Soluseptasine" into the pleural space. Over a period of three weeks after her admission to hospital, 91 ounces of thick, creamy-yellow pus, yielding a pure culture of hæmolytic *Staphylococcus aureus*, were removed; but at the end of this period she still had a mild but definite pyrexia. On April 29 the patient was submitted to daily aspiration and the injection of two cubic centimetres of penicillin solution. A pathological examination of pus was made on May 3; numerous pus cells were present, but no organisms were seen; culture yielded one colony of hæmolytic *Staphylococcus aureus*. Six days later attempted culture was without result, and the pus remained sterile. The pleural injection of penicillin was suspended on May 13. Fever had not been evident since the injections were started, the pulse rate had dropped and reformation of fluid within the pleural cavity had ceased. The right lung had partially reexpanded. The patient felt extremely well, and had suffered no toxic reaction at all. In all she had received twelve injections of penicillin solution, or 120,000 units.

Dr. White said that the penicillin solution was made up in the following manner. An ampoule containing 100,000 units was taken and 20 cubic centimetres of sterile distilled water were added; thus each cubic centimetre contained 5,000 units. A further two cubic centimetres of this solution were taken, and again 20 cubic centimetres of sterile distilled water were added. This solution, containing 500 units per cubic centimetre of penicillin, was injected into the pleural cavity.

Pneumonectomy for Carcinoma of the Lung.

Dr. White and DR. M. P. SUSMAN showed a male patient who had undergone pneumonectomy for carcinoma of the lung. This case will be reported in full in a later issue of the journal.

Bilateral Thoracoplasty for Tuberculosis.

Dr. White and Dr. Susman showed a female patient, aged thirty-five years, who had been admitted to hospital on February 22, 1944. She had been treated for tuberculosis of the left lung since 1938 with artificial pneumothorax and phrenic avulsion. Thoracoplasty on the left side was contemplated in October, 1943, but was then contraindicated by a lesion in the right lung. On February 24, right artificial pneumothorax was attempted, but it failed, and the patient was submitted to thoracoplasty on the left side; this was later followed by thoracoplasty on the right side. On each side three stages were performed, an anterior stage and two posterior stages. The left anterior stage was performed on February 24 and the final posterior stage on the right side was completed on June 1. Although the sputum still contained tubercle bacilli, the number of bacilli seen on smears of sputum had diminished, and in one smear no bacilli were seen.

Gynæcological Conditions.

DR. H. LEAVER discussed several cases of gynæcological interest and showed specimens.

Large Fibroid Tumour.

Dr. Leaver's first case was that of a woman, aged thirty-three years, who had been admitted to hospital complaining that she had missed one menstrual period three weeks previously, after which she suffered from morning nausea and a feeling of "firmness" in the lower part of the abdomen. On examination, a tumour nine inches in diameter was palpated; it filled the whole of the lower part of the abdomen, and *per vaginam* a large mass was felt, thought to be attached to the right ovary. At operation the uterus was found to be enlarged and very firm, and several small sessile fibromyomata were present on the anterior and posterior surfaces. A fibromyoma measuring nineteen centimetres by nine centimetres by thirteen centimetres was removed, together with four smaller ones. Microscopic examination revealed some areas of hyaline degeneration.

Hydatidiform Mole.

Dr. Leaver next discussed the case of a female patient, aged twenty-eight years, who was six weeks pregnant. The patient had been admitted to hospital because of hæmorrhage *per vaginam* of one week's duration. On examination, a mass was palpated in the abdomen, rising from out the pelvis to two inches below the umbilicus. A cystic mass was palpated *per vaginam*; it was continuous with the cervix and the size of a five months pregnancy. Aschheim-Zondek tests produced positive reactions with dilutions of 1/50 and 1/150. Hysterotomy was performed and a large hydatidiform mole was removed.

Carcinoma of the Cervix.

Dr. Leaver next discussed the history of a *multipara*, aged forty-three years.

On May 23, 1943, the patient had reported to the hospital complaining of pain in the back and of hæmorrhage *per vaginam* of six weeks' duration. On examination, the lower part of the abdomen was found to be tender to palpation. *Per vaginam* the cervix was felt to be enlarged, and it contained a hard, necrotic mass. On May 25, 1943, radium implantation in the cervix was carried out; two amounts of five milligrammes and one of ten milligrammes were buried in the cervix, and two amounts of ten milligrammes and one of five milligrammes were buried in each lateral fornix; the total dose was 8,400 milligramme-hours. On July 28, 1943, deep X-ray therapy was started; 7,500*r* were given to the left and right iliac regions and 1,800*r* and 2,100*r* to the right gluteal (oblique) region. This treatment caused nausea, vomiting, abdominal pain, swelling of the right leg and blisters on the external genitals. On November 16, 1943, the patient was admitted to hospital suffering from pain in the right leg and thigh and the back; the pain was relieved by physical therapy. On May 4, 1944, she was readmitted to hospital with extreme anæmia, and she died on May 18, 1944. Post-mortem examination revealed metastases in the liver, a neoplastic mass adherent to the pelvic wall with an adherent coil of small bowel, and bilateral hydronephrosis.

Carcinoma of the Cervix Involving the Rectum.

Dr. Leaver's final case was that of a *multipara*, aged fifty-seven years. On October 4, 1942, the patient had reported to the hospital complaining of vulval irritation, a yellow discharge *per vaginam* and sacral pain of six weeks' duration. Biopsy of the cervix revealed early squamous carcinoma with an accompanying acute inflammatory reaction. From October 27 to October 29, 1942, radium was applied to the cervix; three amounts of ten milligrammes were implanted in the uterus, and one amount of ten milligrammes and two amounts of five milligrammes were applied to the lateral fornices. The dosage was 3,200 milligramme-hours. From November 3 to November 6, 1942, radium was applied to the cervix in the same distribution, the dosage being 5,200 milligramme-hours. This treatment was followed by deep X-ray therapy at Sydney Hospital.

On July 1, 1943, the patient was readmitted to hospital complaining of hæmorrhage *per rectum* of two months' duration. Digital examination *per rectum* revealed a roughening of the anterior rectal wall. Sigmoidoscopic examination revealed an extensive area of ulceration on the anterior rectal wall extending from the level of the cervix to just beyond the upper limits of the rectum. This was considered to be an extension of the cervical carcinoma. For the next two months the patient was given repeated blood transfusions to combat the extreme anæmia. She died at her own home on March 23, 1944.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on June 14, 1944, at the Children's Hospital, Carlton, Melbourne, DR. ALAN MCCUTCHEON, the President, in the chair.

Cholelithiasis.

DR. ROBERT SOUTHBY showed a boy, aged thirteen years, suffering from cholelithiasis. Dr. Southby said that the

child was presented because of the rarity of the disease from which he suffered. Children were seen in the out-patient department whose principal complaints were abdominal pain, vomiting and inability to tolerate fats. It was customary to treat such children with a fat-free diet, to administer rhubarb and soda, and not to investigate their condition further. This was a mistake. At any rate, if there was no response to simple measures, cholecystography would be worth while. If this was carried out more frequently, in many cases fat indigestion and fat intolerance might prove to be due to gall-bladder disease. Dr. Southby said that the first case described in a child was reported by James Gibson, of Edinburgh, in 1734. The patient was a boy, aged twelve years, who gave a history of recurrent colicky abdominal pain, jaundice, shivering and sweating. The child became emaciated and died after an illness lasting eighteen months. At autopsy several stones were found, one of which was lodged in the cystic duct. The gall-bladder contained two pints of bile, and there were five pints of fluid in the abdominal cavity. The liver contained numerous rounded swellings, which proved to be multiple abscesses. After this case many others appeared in the literature. On account of the intense jaundice and the severity of the illness the conditions were not considered surgical, and each patient was watched through a long illness.

Dr. Southby said that the patient he was showing had for two years experienced attacks of upper abdominal pain of a colicky nature lasting for an hour or more, and associated with vomiting. It was noticed that these attacks were worse after he had taken milk or fatty foods. At times the vomitus was dark brown in colour. These paroxysms left the child weak. Two attacks of shivering had occurred with the episodes during the last three months. As a baby, the child had never been able to tolerate cow's milk. As the breast supply was unsatisfactory in quantity, condensed milk was selected by the mother for his feedings. As he grew older his mother noticed an intolerance to butter, milk, eggs and fat of meat. There was nothing relevant in the family history. Dr. Southby said that cholecystography revealed a calculus in the region of the gall-bladder. This organ did not show up after ingestion of dye; the appearances suggested that it was not functioning. Examination after a barium meal revealed a normal stomach and duodenum. By this time jaundice had become a prominent symptom. The urine contained bile pigments, but not bile salts. Treatment at this stage was by means of a fat-free diet and rest in bed for a few days. "Veracolate" tablets and a rhubarb and soda mixture were also ordered. The skin became irritable and the jaundice became more pronounced. The Fouchet test produced a positive reaction. The leucocytes numbered 10,000 per cubic millimetre. The cholesterol content of the blood was 183 milligrammes per hundred cubic centimetres. Another attack of pain and vomiting with pyrexia and sweating brought matters to a head. The child was admitted to hospital in the care of Dr. W. W. McLaren. He was intensely jaundiced; the liver was enlarged to three fingers' breadth below the right costal margin. The bowels were costive and the stools were clay-coloured. The bleeding time and the coagulation time were normal in each case. The Van den Bergh test produced a direct positive reaction, as did the Fouchet test when this was repeated. A further interpretation of the X-ray film was obtained; this was to the effect that the gall-stone appeared to be in the common bile duct. The treatment was supplemented with the injection of vitamin *K*, one cubic centimetre being given intramuscularly twice a week. "Desicol" capsules and twenty grammes of calcium lactate were given three times a day, and the patient was submitted for surgery.

DR. ERIC PRICE completed the clinical story. He said that he had used an upper right paramedian incision. Hæmorrhage was not troublesome. The liver was enlarged, hard and a slaty-green in colour. No gall-bladder could be found; a tough fibrous nodule about the size of a walnut was present in the site usually occupied by that organ. It apparently had no connexion with the common bile duct. It was presumed to be a congenital mucocele of the gall-bladder. The common bile duct was grossly dilated and thickened. There was a small thickened pouch on the anterior aspect of the common bile duct above the duodenum. The common bile duct was opened; it contained thin, sticky clear fluid. The stone, which was palpated behind the duodenum, was "milked" up and removed. The nodular mass in the gall-bladder fossa was also removed after the main part of the operation had been completed. Dr. Price said that he had satisfied himself that no more calculi were present, and had drained the duct by a fine rubber tube sutured to the duct and directed upwards towards the liver. A large tube was used to drain Morrison's pouch. Towards the end of the operation yellow bile was seen to run from the common bile duct.

Dr. Price said that after the operation bile drained in amounts varying from 60 to 120 cubic centimetres per day, though during the first two days very little bile escaped. The stools remained clay-coloured for some days, but at the time of the meeting they were normal in colour and consistency. The icteric index six days after the operation was 66 units; thirteen days after the operation it was 44 units. Bile ceased draining on the tenth day, and the tube fell out on the twelfth day. Jaundice rapidly decreased, and at the time of the meeting the child was well.

Dr. Price said that two important points arose out of the case. The first was concerned with the relationship of congenital absence of the gall-bladder to fat intolerance, and the second was the situation in the out-patient department with regard to chronic abdominal pain. Large numbers of such patients might be spared the indignity of surgical examination and diagnosis if their diets were readjusted and a rhubarb and soda mixture was given by the physicians. Many patients were admitted to hospital and had their appendices out; some of them seemed to return with a recurrence of their pain.

DR. H. DOUGLAS STEPHENS congratulated the members on the excellent teamwork demonstrated in diagnosis, radiography and surgical technique; this had enabled a splendid effort to be achieved in a remarkably short time. Dr. Stephens said that comment in the American literature on the subject of cholelithiasis in children was focused on one point—the relationship between calculus formation and hæmolytic processes in the blood stream. In many of the cases described (Porter had quoted six hundred in children), discussion had centred around whether the spleen should be removed first and then the gall-bladder dealt with, or *vice versa*. Dr. Stephens said that he remembered a boy with a large liver and spleen; the diagnosis of acholuric jaundice seemed the most likely. After two years no evidence accumulated to establish a diagnosis of cholelithiasis. The spleen was removed, and at the time of the meeting the child was doing well. Perhaps splenectomy would benefit the patient under discussion. Investigation of the blood would certainly be worth while.

DR. HENRY SINN asked by what new technique the radiologist was able to determine the position of the stone in the common bile duct.

DR. RALPH ALLEN said that he was concerned about the question of recurrence, and asked what efforts could be made to prevent it. The accepted blood cholesterol level was too low, and apparently it was unaffected by diet, so there appeared to be no advantage in forbidding the patient to take fats.

DR. BRUCE HALLOWS said that he was interested in the question of chronic abdominal pain in childhood. Many of such children had been receiving a diet relatively rich in fat. Examination revealed that the conjunctivæ were injected rather than icteric. The liver was enlarged one or two fingers' breadth below the right costal margin. It was Dr. Hallows's custom to refer these patients to the general clinic, under the care of his sister, Dr. Gladys Hallows. He had noticed that when the amount of fat in the diet was decreased and the liver was unloaded by magnesium sulphate, dramatic improvement set in; the appetite improved and the dyspepsia disappeared.

DR. KATE CAMPBELL said that whilst taking the family histories in cases of fatty dyspepsia, she had been struck by the frequent existence of an hereditary factor of hepatic insufficiency, occasionally associated with gall-stone formation. Such observations made her wonder whether a patient with a healthy liver could develop gall-stones.

Dr. Southby, in reply, said that he was glad Dr. Stephens had raised the question of the part played by hæmolytic processes in many of these cases. Dr. Southby had noticed that in a number of papers on the subject, two large groups of cases existed. The first was concerned with newborn infants affected with so-called gall-stones, which were rather of the nature of biliary mud or inspissated bile; these accompanied the so-called uric acid infarcts in the kidneys. The second group resembled the gall-stones of adults, and were similar to the case under discussion. Quite a number of cases were recorded among children who were the subjects of acholuric jaundice. Another group had a history of typhoid fever in early infancy or infection with *Lamblia intestinalis*. Discussing the question of chronic abdominal pain, Dr. Southby said that if the "appendiceal" cases were followed up, in quite a number threadworms would be found

in the appendix. On the other hand, when an appendix was found to be normal at operation, it was recommended that the gall-bladder be palpated through the incision, when pathological changes might be found. Dr. Southby said that Dr. Campbell's point of the frequent family history of hepatic insufficiency with predisposition to liver and gall-bladder disease was important, and he was in entire agreement with her view. He was indebted to Dr. John Gooch, who had presented him with an excellent summary of the case under discussion.

Dr. Price said he, too, was indebted to Dr. Gooch for the same reason as that given by Dr. Southby. He had encountered two other cases of gall-stones in children. In one instance, Dr. Barrington Ward had removed multiple spiculated calculi. In the present case, a single cholesterol stone only was present. Reverting to chronic abdominal pain, Dr. Price said that in only a small number of instances was it shown to be due to definite pathological changes. Dr. Hallows had commented on the high proportion of fat in the diet; Dr. Price said that in his experience high carbohydrate intake was more frequently to blame. Bread and jam and meat pies figured prominently and frequently in the dietary of such patients. Perhaps he had overlooked the fat dyspepsias. He pointed out again that the treatment of affected children was a medical priority, and yet they were not infrequently accompanied by a letter urging appendicectomy.

(To be continued.)

Correspondence.

A NATIONAL MEDICAL SERVICE.

SIR: I have repeatedly been impressed by the extreme timidity of the medical profession and the Government, both of this country and Great Britain, to make any attempt to assess the financial value of a doctor's services to the community. When one considers that the extreme suspicion and reluctance of the profession to collaborate with the Government in a health service is very largely based on doubts over this issue, it is all the more remarkable that no attempt has been made by either side to clarify the position. This letter then is written in the hope that it will start some discussion that will force this vital issue into the open. Free discussion at this stage may well save bitter recrimination later on. I am sure that this question is regarded as of at least equal importance to all the so-called "general principles" of a health service by the majority of practitioners. I am also sure that in this respect an ounce of concrete agreement beforehand is worth a ton of blind confidence in the Government or in our elected representatives. Herein the profession in Britain are making their greatest mistake. The reluctance to discuss pounds, shillings and pence is entirely analogous to the pocket in the tail of the old-time barrister's gown, that allowed him to receive his fee without the embarrassment of witnessing a vulgar monetary transaction. Unlike our colleagues in Britain, let us cut the pocket out of the tail of our gown and insist on some solid financial talks as a first consideration, not as some apparently minor detail that "can be settled later". With these considerations in mind I submit the following suggestions as a minimum standard of values. A salary of £500 per year for a forty-hour week for all doctors after graduation and before marriage. A salary of £750 per year on marrying, and an increase of £100 per year for each child, this amount to be increased to £150 per year during the period of secondary and university education of the child, and the allowance to cease altogether when the child becomes self-supporting. There shall be yearly increments of £25 per year, which shall be merely the normal reward for faithful service to the community and be apart from increases due to promotion, which shall be based on merit alone. Anyone wishing to specialize shall be given every facility to do the extra work and acquire the extra qualifications necessary. Existing specialists of approved status shall be accepted automatically. The basic payment of a specialist would be 50% higher than that of a general practitioner. Practitioners and specialists transferring from existing practice to the service will be automatically credited with the total of the yearly increments appropriate to the time since graduation. Working overtime would not be encouraged, as a fatigued doctor is a menace to his patient, but in the early years of the scheme while the extra doctors required are being trained it would probably be necessary. For time worked in excess of forty hours, 50% extra would be paid. The retiring age would be sixty years, but it would be optional to continue for a further five years. On retiring the doctor would revert to the basic commencing salary of £500 per year if single, £750 per year if married. After the death of the retired doctor one-half of this amount, £375 per year, would be paid to his widow until her death. In the event of a doctor's death or invalidism during the period of service, the same arrangement precisely would apply, the basic salary to himself and wife, or to his widow in the event of his death, *plus* the basic allowances for any children as set out above. The above scheme is based on pre-war values and would be automatically reviewed every three years and any appropriate alteration made in strict accordance with alterations in the cost of living. It is, of course, understood that all overhead expenses of medical practice, holidays *et cetera* would be found by the employing body. I claim that the scheme of payment outlined above would free the doctor from all considerations of financial security and would allow him to lead a dignified life, secure in the knowledge that he could devote himself to his profession without the worrying considerations that blight most of our lives, the race against time to achieve financial security.

Yours, etc.,

LANCE HEWITT.

"Alpha",
Cambridge Street,
Enmore.
July 9, 1944.

THE TREATMENT OF INGROWING TOENAILS.

SIR: *Re* my article on "The Treatment of Ingrowing Toenails", which recently appeared in THE MEDICAL JOURNAL OF AUSTRALIA. I would be pleased if you would publish this letter, as I would like to acknowledge the help I have received from Lieutenant-Colonel V. M. Coppleson, of Sydney, who, as a result of a study of the subject at an Australian general hospital, originally drew my attention to the procedure of excision of the nail and nail bed in the treatment of this disease, a fact which was inadvertently omitted from the "Acknowledgements" to my article.

Yours, etc.,

T. E. WILSON,
Major, Australian Army
Medical Corps.

July 17, 1944.

AN ADDRESS.

SIR: Last Saturday the Adelaide *Advertiser* featured an extended summary of the address of the retiring President, Dr. E. A. H. Russell, to the South Australian Branch of the British Medical Association—obviously as part of its very vigorous campaign against the Federal Government and the Federal Referendum. As it is very unusual, if not unprecedented, for such an address to be made available to the lay Press before it appears in the journals, I submit one is justified in assuming that the supplier was a willing cooperator with the newspaper in its campaign.

Some weeks ago an information bulletin issued by the Institute of Public Affairs, which shares similar views with the *Advertiser*, was included with routine British Medical Association Branch circulars. This bulletin was, like Dr. Russell's address, an extremely one-sided attack on planned medical services.

Take these two happenings, coupled with the recent ill-considered and obviously politically biased statement on butter rationing issued on behalf of the Federal Council of the British Medical Association, and, I think, we have reason to be concerned lest the impression, already commonly held by the public, should grow stronger, that the British Medical Association is more concerned with upholding the special privileges of the medical profession than with cooperating with those working for the welfare of the community.

Such a trend is to be avoided in the interests of the fullest application of the knowledge and skill of the medical and allied professions to the great human problems of preventing and curing ill health.

Yours, etc.,

ALAN FINGER.

Infectious Diseases Hospital,
Northfield,
South Australia.
July 14, 1944.

[The copy of Dr. Russell's address was made available to the Adelaide *Advertiser* by the Editor of this journal, who acted with a full knowledge of what he was doing and saw a means of bringing before the public the views of the Federal Council and of the Branches.—EDITOR.]

Naval, Military and Air Force.

CASUALTIES.

ACCORDING to the casualty list received on August 5, 1944, Major J. I. Robertson, A.A.M.C., Killara, New South Wales, who was previously reported seriously and dangerously ill, has since died of illness.

Australian Medical Board Proceedings.

QUEENSLAND.

THE undermentioned have been registered, pursuant to *The Medical Acts*, 1939-1940, of Queensland, as duly qualified medical practitioners:

Lankester, Charles William, M.B., B.S., 1944 (Univ. Queensland), 3, Hetherinton Street, Herston, N.1, Brisbane.

Law, William Brown, M.B., B.S., 1944 (Univ. Queensland), Welwyn Crescent, Coorparoo, S.E.2, Brisbane.

Lebanon, Miriam, M.B., B.S., 1944 (Univ. Queensland), 124, Francis Street, Bondi, Sydney, New South Wales.

Macpherson, Ronald Kenneth, M.B., B.S., 1944 (Univ. Queensland), Mount Pleasant Flats, Barker Street, New Farm, N.1, Brisbane.

Obituary.

JAMES McIMERY PARDEY.

WE regret to announce the death of Dr. James McImery Pardey, which occurred on July 31, 1944, at Launceston, Tasmania.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Collin, Robert, M.B., B.S., 1942 (Univ. Sydney), Flight Lieutenant R. Collin, "Larundel", R.A.A.F., Preston, Victoria.

Bernard, Gwenifer Catherine May, M.B., B.S., 1939 (Univ. Sydney), 73, Wyong Road, Cremorne.

Medical Appointments.

Dr. Harry Fenwick Hustler has been appointed honorary medical officer to assist in the female venereal diseases clinic and honorary clinical assistant to the gynæcological section, Royal Adelaide Hospital.

Dr. Roy Stanley McGregor has been appointed Government Medical Officer at Maryborough, Queensland.

Books Received.

"Elementary Hygiene for Nurses: A Handbook for Nurses and Others", by H. C. Rutherford Darling, M.D., M.S. (London), F.R.C.S. (England), F.R.F.P.S. (Glasgow); Eighth Edition; 1944. London: J. and A. Churchill, Limited. 7" x 5", pp. 299, with illustrations.

"The Diseases of the Endocrine Glands", by Hermann Zondek, M.D. (Berlin), translated by Carl Prausnitz Giles, M.D. (Breslau), M.R.C.S. (England), L.R.C.P. (London); Fourth (Second English) Edition; 1944. 9" x 5", pp. 504, with illustrations. Price: 40s. net.

"Midwifery for Nurses", by Aleck W. Bourne, M.A., M.B., B.Ch. (Cambridge), F.R.C.S. (England), F.R.C.O.G.; Third Edition; 1944. London: J. and A. Churchill Limited. 8" x 5", pp. 304, with illustrations. Price: 7s. 6d.

Diary for the Month.

AUG. 14.—Victorian Branch, B.M.A.: Hospital Subcommittee.
AUG. 14.—Victorian Branch, B.M.A.: Finance Subcommittee.
AUG. 15.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 15.—Victorian Branch, B.M.A.: Organization Subcommittee.
AUG. 16.—Western Australian Branch, B.M.A.: Branch Meeting.
AUG. 17.—Victorian Branch, B.M.A.: Executive Meeting.
AUG. 22.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 23.—Victorian Branch, B.M.A.: Council Meeting.
AUG. 24.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 25.—Queensland Branch, B.M.A.: Council Meeting.
AUG. 31.—New South Wales Branch, B.M.A.: Branch Meeting.
SEPT. 1.—Queensland Branch, B.M.A.: Branch Meeting (Jackson Lecture).
SEPT. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
SEPT. 6.—Western Australian Branch, B.M.A.: Council Meeting.
SEPT. 6.—Victorian Branch, B.M.A.: Branch Meeting.
SEPT. 7.—New South Wales Branch, B.M.A.: Special Groups Committee.
SEPT. 8.—Queensland Branch, B.M.A.: Council Meeting.
SEPT. 8.—Victorian Branch, B.M.A.: Legislative Subcommittee.
SEPT. 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 12.—Tasmanian Branch, B.M.A.: Branch Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

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